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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Bureau of Sport Fisheries and Wildlife
Washington 25, D. C.

1959 STATUS REPORT OF WATERFOWL

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Compiled by W. F. Crissey, Staff Specialist
Branch of Wildlife Research

Special Scientific Report -- Wildlife No. 45

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INTRODUCTION

Each year during early August the waterfowl shooting regulations for the fall season are established. At that time current information regarding the status of the population must be available to Game Administrators to provide a sound basis for the determinations.

The surveys are conducted annually for the purpose of ascertaining waterfowl population status. These are: (1) a January survey of the continental wintering areas to measure the distribution and relative number of birds remaining after the close of the previous shooting season; (2) a survey among waterfowl hunters immediately following the shooting season to measure the size of the kill and the effect of hunting regulations on hunter activity and kill; and (3) a survey of the major continental breeding areas during May, June and July to measure size and distribution of the breeding population and the relative number of young produced.

This report summarizes the results of the three surveys and presents a forecast of anticipated change in the relative size of the 1959 fall flight of ducks, geese, brant, and coot in each of the waterfowl flyways in the United States.

SCOPE OF INVESTIGATIONS AND METHODS USED

Winter Survey

During recent years the annual survey of waterfowl wintering grounds has included the major wintering areas in Alaska, Canada, the United States, and Mexico. During the period 1948 through 1955 the survey included also the wintering areas in the West Indies. In 1956 the West Indies survey was temporarily discontinued due primarily to the relatively low number of birds recorded there (a maximum of about $\frac{1}{4}$ million) in relation to the large amount of flying that was required to cover the areas. When the West Indies survey was discontinued in 1956 it was with the intention that the areas would be flown at intervals of 4 or 5 years for the purpose of checking on general waterfowl conditions. Therefore, the Bureau included the West Indies in the winter survey again this year. In addition to the wintering areas in Cuba, Haiti, and the Dominican Republic, the crew covered wintering areas in the Bahama Islands, which had not been surveyed since 1949.

In the United States, the Bureau of Sport Fisheries and Wildlife organized the surveys, but much of the field work was accomplished by the 48 State Conservation Departments. In Canada the Canadian Wildlife Service organized the survey and the field work was carried out by that Agency and the Provinces. In Alaska, Mexico, and the West Indies the survey was both organized and carried out by Bureau personnel.

The wintering areas were surveyed by means of boats, cars, and planes, with all important areas being covered from the air. Information as to personnel, equipment, and distances traveled, is presented in the following table:

TABLE 1. Participation in 1959 Winter Waterfowl Survey

| Location | Number of Observers | | | | Aerial Coverage | | | Miles Driven |
|-----------------------|---------------------|-------|-------|-------|------------------|----------------|----------------|-----------------|
| | U. S. | State | Other | Total | Number Planes | Hours Flown | Miles Flown | |
| Pacific Flyway | 46 | 297 | 4 | 347 | 33 | 195 | 17,874 | ? |
| Central Flyway | 57 | 319 | 11 | 387 | 35 | 227 | 21,581 | 44,500 |
| Mississippi Flyway | 77 | 720 | 17 | 814 | 47 | 253 | 22,336 | 53,057 |
| Atlantic Flyway | 43 | 97 | 31 | 171 | 29 | 254 | 25,918 | 6,277 |
| Total U. S. | 223 | 1,433 | 63 | 1,719 | 144 | 929 | 87,709 | 103,834 |
| Alaska | 3 | 0 | 0 | 3 | 1 | 9 | 1,200 | 0 |
| Canada | ? | ? | ? | 24 | ? | ? | ? | ? |
| Mexico | 4 | 1 | 0 | 5 | 2 | 96 | 12,335 | 0 |
| West Indies & Bahamas | 2 | 0 | 0 | 2 | 1 | 27 | 3,480 | 0 |
| GRAND TOTAL | 232 | 1,434 | 63 | 1,753 | 148 | 1,061 | 104,724 | 103,834 |

Breeding Population and Production Surveys

Surveys are conducted annually on the waterfowl breeding grounds for the purpose of estimating changes in the relative size of the fall flight from each of the breeding areas. Two surveys of the breeding areas are required to obtain the necessary information. The first survey is made during May and June for the purpose of measuring the distribution and relative size of the breeding population. The second survey is carried out during July for the purpose of forecasting the relative number of young produced. In July it is necessary to in part "forecast" the number of young that will be produced since by the time field work must be terminated in order to have the data available for use in setting shooting regulations, only a portion of the total season's production will have hatched. The production survey, therefore, consists of a measure of the number of broods on the water at the time of the survey plus a measure of weather, water, and other conditions which affect or reflect production success after the survey period.

The bulk of the important waterfowl breeding areas in Alaska, Canada, North Dakota, South Dakota, and Minnesota are surveyed from the air using statistically designed sampling techniques. Similar methods of collecting and analyzing data are used throughout these areas. In addition to the areas mentioned above, approximately 22 of the Northern States conduct breeding ground surveys. Methods of conducting surveys vary somewhat among these States, although the methods employed in States with important numbers of breeding ducks are similar in most respects to those employed in the Dakotas, Canada, and Alaska.

During recent years aerial crews have sampled approximately 2,375,000 square miles of the best duck breeding habitat on the Continent. The only important duck breeding areas that have not been censused are those in Eastern Ontario, Quebec, and Laborador. Surveys have not been conducted in these areas due to the fact that adequate census techniques have not yet been developed.

The aerial crews count the birds on somewhat less than one percent of the total breeding area. This amount of flying is sufficient to reduce sampling error to less than 20 percent of the average population density in most survey areas, and to much less than 20 percent when considering the breeding range as a whole.

The results of the breeding ground surveys are presented as "index" figures. When conducting aerial surveys of breeding birds, or of broods, not all birds present are seen by the aerial crews. Work is presently in progress to develop methods for measuring the proportion of birds present that are seen but these studies have not progressed to the point where visibility factors can be determined throughout the breeding range. Therefore, the indices presented in this report are based on birds actually seen, and it is emphasized that they do not constitute an estimate of total population present.

The results of the breeding population and the production surveys are combined to form the basis for forecasting changes in the relative size of the fall flight of ducks and coot in the three western Flyways. In the Atlantic Flyway it is not possible to rely on the breeding ground information to the same degree as in the western Flyways due primarily to the lack of survey data from Quebec and Labrador, which are important contributors of birds to the Flyway.

The breeding ground surveys are cooperative in nature. The Bureau of Sport Fisheries and Wildlife, the Canadian Wildlife Service, the Provincial Game Branches, Ducks Unlimited, and the State Conservation Agencies combine their equipment and manpower to conduct the necessary surveys throughout the vast extent of the waterfowl breeding range.

Waterfowl Kill Survey

Each year following the shooting season the Bureau carries out a mail-questionnaire survey among waterfowl hunters for the purpose of determining the number of birds killed and the relationship between hunting regulations, hunter activity, and harvest. Mailing addresses for the questionnaire survey are obtained at the time the duck stamps are purchased at a series of randomly selected post offices. During the past year the plan for selecting Post Office Sampling Units was modified somewhat by including post office substations as well as the main post offices in the list from which the units were drawn. This modification reduced the average size of the sampling units and increased their uniformity. This change became possible as a result of certain modifications in accounting practices in the Post Office Department and has resulted in an increase in sampling efficiency.

The specific objectives of the 1958-59 kill survey were as follows:

1. To estimate total retrieved^{1/} and unretrieved ducks, geese and coots, by Flyways.
2. To estimate total number of potential and active waterfowl hunters, by Flyways.
3. To estimate the average times hunted per waterfowl hunter.
4. To estimate the geographic and density distribution of hunters in the areas of waterfowl hunting.
5. To estimate number of banded waterfowl bagged.
6. To determine proportion of waterfowl hunting on lands under private and public jurisdiction.
7. To estimate the distribution of hunters on seven broad habitat types.

Only the results related to Objectives 1 through 3 above are being reported at this time. Data related to Objectives 4 through 7 will be summarized and analyzed in a later publication

^{1/} The primary sampling objectives being a standard error not in excess of 5 percent of the mean bag of ducks.

The number of questionnaires mailed out and the number returned in each Flyway are shown in the following table:

1958-59 Sample

| Flyway | No. of Hunters | | No. of Hunters | | Percent | |
|-------------|-----------------------------|---------|----------------|------------|---------|---------|
| | Receiving Questionnaires | 1958-59 | 1957-58 | Responding | 1958-59 | 1957-58 |
| Atlantic | 13,093 | 15,804 | 9,306 | 11,160 | 71.1 | 70.6 |
| Mississippi | 17,097 | 15,022 | 11,902 | 10,226 | 69.6 | 68.1 |
| Central | 6,598 | 8,087 | 4,550 | 5,386 | 69.0 | 66.6 |
| Pacific | 11,756 | 6,634 | 8,396 | 4,743 | 71.4 | 71.5 |
| Total | 48,544 | 45,547 | 34,154 | 31,515 | 70.4 | 69.2 |

Experience has shown that mail-questionnaire data from hunters contain both sampling errors and response-bias errors. Hunters tend to exaggerate when reporting their kill which results in an inflated estimate. These response errors are not consistent in size from one area to another or from one year to the next in the same area. Also, they are large as compared to sampling error and their presence seriously limits the usefulness of the survey data unless they are removed.^{1/}

Methods for removing response-bias errors have been developed^{2/} and kill data presented in this report have been adjusted in accordance therewith.

The Bureau's annual survey to determine waterfowl kill has been organized and supervised by E. L. Atwood, Chief, Section of Wildlife Biometry, Branch of Wildlife Research, since 1952.

1/ E. L. Atwood, Validity of Mail Survey Data on Bagged Waterfowl, Journal of Wildlife Management, Vol. XX, No. 1, pages 1 through 16.

2/ E. L. Atwood, A Procedure for Removing the effect of Response Bias Errors from Waterfowl Questionnaire Responses, Biometrics, Vol. XIV, No. 1, March 1, 1958.

Pacific Flyway Data

Waterfowl Kill Information

A fire in the I.B.M. processing room in late June destroyed the original waterfowl hunters survey records from two States and part of the records from the remaining States in the Pacific Flyway before tabulations had been prepared from them for the 1958-59 waterfowl hunting season. The process of salvaging original records and duplicating or punching new I.B.M. cards was not completed in time to tabulate information necessary for the preparation of the report for this Flyway by printing deadline. Therefore, the following information regarding number of waterfowl hunters is all that is available at the present time.

Number of Hunters

| | | | Percent Change 1957-58 to 1958-59 |
|--|---------|---------|---|
| | 1958-59 | 1957-58 | |
| | | | |

Number of Potential Hunters

| | | | |
|--------------|---------|---------|--------|
| 16 and over* | 390,187 | 409,719 | - 4.77 |
|--------------|---------|---------|--------|

* Individuals who purchased a Duck Stamp with intent to hunt.

Winter Trend Data - Pacific Flyway

The winter surveys during the year 1958 and 1959 were conducted under reasonably comparable conditions throughout all areas that are covered regularly during the survey. In Alaska and British Columbia the total wintering habitat is not completely covered. The areas surveyed are selected on the basis that there is a fair degree of certainty that they can be covered each year. In the United States and Mexico an effort is made to cover all concentration areas completely. In the Central Valley in California, aerial photography is used to check the accuracy of visual estimates of the number of birds in the larger concentration.

The tables and figures which follow present the waterfowl data in two categories. The first tables presents a comparison of 1958 and 1959 data. Following this are presented comparisons of data taken during the period 1949 through 1959. When arriving at a trend figure for each of the past 11 years, it was recognized that the winter survey data were not comparable. For example, it was not possible for the Bureau to conduct a survey in Mexico during January 1957. When there were differences in coverage between one year and the next, an estimate was calculated based on the assumption that areas where comparable surveys were conducted, yielded an accurate measure of percent change in population from one year to the next. Although in most instances, comparable coverage between one year and the next does provide a useable measure of percent change in population, there is question regarding the estimated duck figure for 1957 based on this method of estimation. It will be noted in the graph which follows that there was a considerable decrease between 1956 and 1957 and an increase between 1957 and 1958 which more than compensated for the decrease. At this point it seems doubtful that the trend in duck population was downward in 1957.

Among the ducks there was a small decrease recorded in the number of pintails, which is the most important bird in the flyway. It is perhaps significant to note that the total pintail breeding population index has been steadily decreasing since 1956, and during this past spring the index was more than 40% below the 1956 level. Since the Pacific Flyway regularly winters from half to two-thirds of the pintail population, there appears to be a discrepancy between the population trend as portrayed by the winter data and the information from the breeding ground.

Small to moderate increases were recorded for most other important duck species with the exception of canvasback, which decreased approximately one-fourth.

The overall goose population increased a small amount with all species increasing except cackling geese which decreased 30 percent.

Special attention is called to the graph showing the trend in black brant population. The winter survey revealed that the brant population is markedly reduced as compared to 1958 and is considerably below the average of the past 11 years.

Percent Change in Pacific Flyway Population Index Figures for Ducks, Geese, Brant, Swan, and Coot - January 1958 to January 1959 (Comparable Coverage)

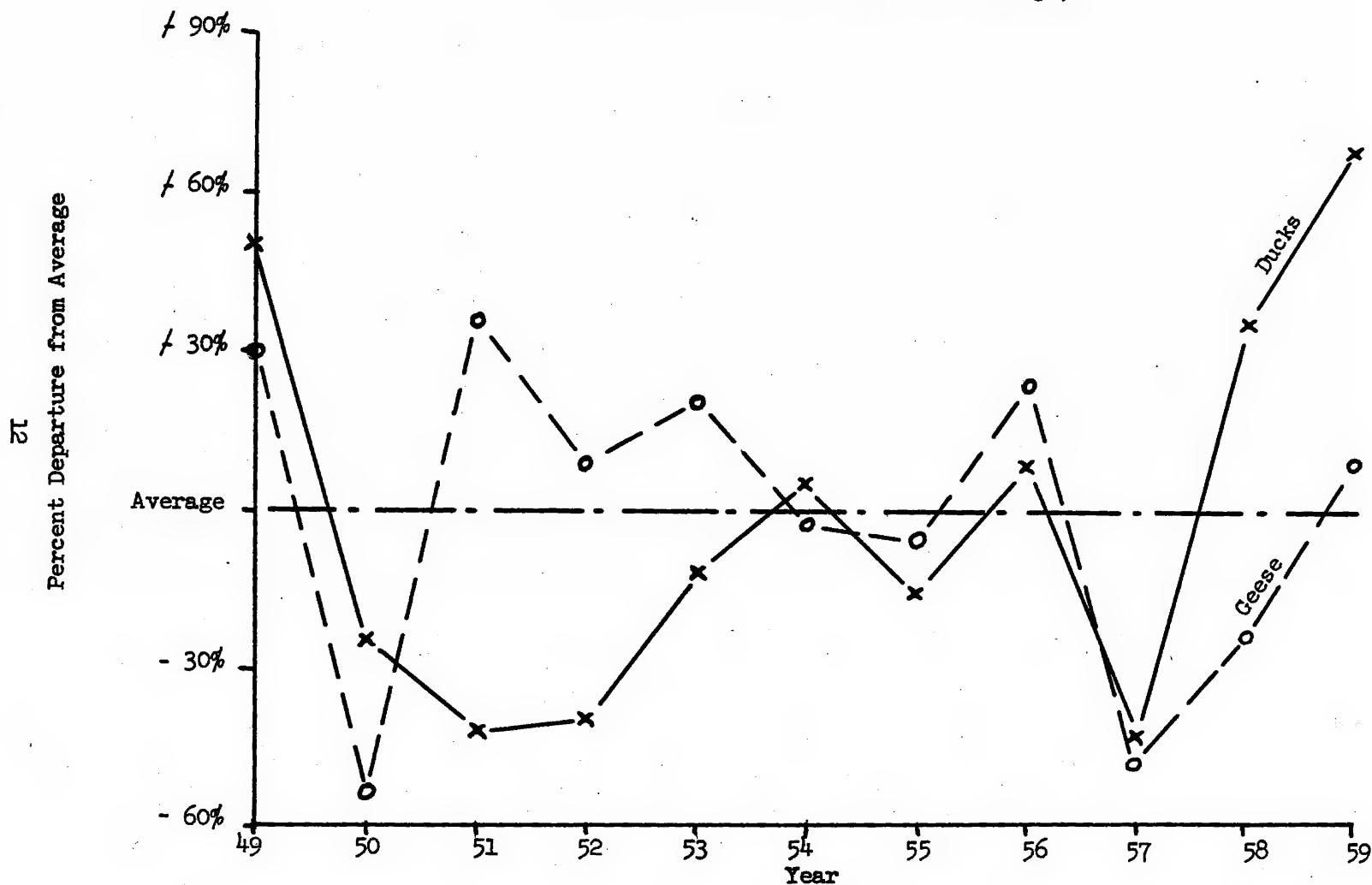
| Area | Ducks | Geese | Brant | Swan | Coot | Total |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Alaska | + 11 | - 20 | - | + 34 | - | + 6 |
| British Columbia | - 22 | - 19 | - | - 56 | - 83 | - 31 |
| Pacific Flyway States | + 1 | + 11 | - 58 | - 20 | + 33 | + 4 |
| Mexico (West Coast) | + 82 | + 366 | - 36 | - | - 30 | + 64 |
| TOTAL | + 10 | + 12 | - 46 | - 21 | + 24 | + 10 |

Species Composition - Pacific Flyway - 1958 and 1959
 (Comparable Coverage)

| Species | Percent of Birds Identified | | Percent Change |
|-----------------------|-----------------------------|-------|----------------|
| | 1958 | 1959 | |
| <u>Dabbling Ducks</u> | | | |
| Pintail | 31.4 | 25.9 | - 8.0 |
| Mallard | 21.4 | 24.3 | + 26.9 |
| Baldpate | 12.3 | 11.2 | + 1.8 |
| Shoveler | 4.2 | 4.2 | + 12.2 |
| G. W. Teal | 3.5 | 6.2 | + 97.3 |
| Gadwall | .9 | 1.0 | + 30.2 |
| B. W. Teal | .3 | .5 | + 119.9 |
| Wood Duck | Tr. | Tr. | + 183.3 |
| Sub-Total | 74.0 | 73.3 | + 10.7 |
| <u>Diving Ducks</u> | | | |
| Scaup | 3.4 | 3.6 | + 18.8 |
| Canvasback | 1.4 | 1.0 | - 23.4 |
| Ruddy | 1.3 | 1.7 | + 51.2 |
| Goldeneye | .4 | .4 | + 20.8 |
| Bufflehead | .3 | .3 | + 16.1 |
| Redhead | .2 | .5 | + 278.2 |
| Ringneck | .1 | .1 | + 72.6 |
| Sub-Total | 7.1 | 7.6 | + 22.3 |
| <u>Misc. Ducks</u> | | | |
| Scoter & Eider | .8 | 1.0 | + 34.8 |
| Merganser | .2 | .2 | + 9.9 |
| Tree Ducks | .2 | - | - |
| Old Squaw | Tr. | Tr. | + 76.0 |
| Sub-Total | 1.2 | 1.2 | + 6.9 |
| <u>Geese</u> | | | |
| Snow Goose | 3.1 | 3.4 | + 22.4 |
| Cackling Goose | 1.9 | 1.2 | - 29.9 |
| Canada Goose | 1.8 | 2.0 | + 28.5 |
| White-fronted Goose | 1.2 | 1.4 | + 27.7 |
| Ross' Goose | .1 | .1 | - 3.6 |
| Sub-Total | 8.1 | 8.1 | + 11.9 |
| Whistling Swan | .5 | .3 | - 21.5 |
| Trumper Swan | Tr. | Tr. | + 49.0 |
| Black Brant | 1.2 | .6 | - 45.6 |
| Coot | 8.0 | 8.9 | + 23.6 |
| GRAND TOTAL | 100.1 | 100.0 | + 10.5 |

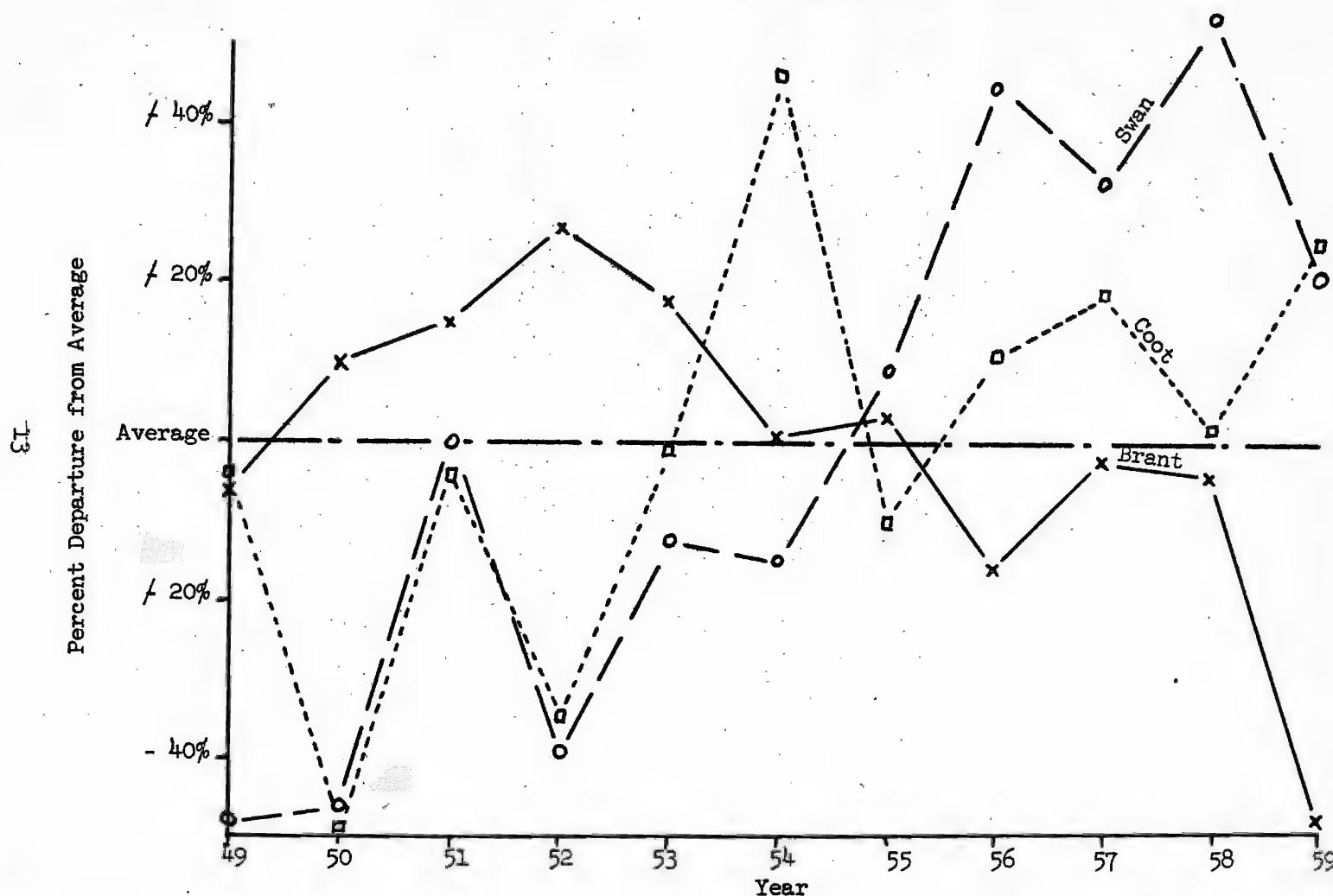
Trend in Duck and Goose Populations - Pacific Flyway

1949 through 1959 (Comparable Coverage)



Trend in Brant, Swan and Coot Populations - Pacific Flyway

1949 through 1959 (Comparable Coverage)



ALASKA

Weather and Water Conditions

Spring break-up was about two weeks later than normal north and east of a line from Anchorage to Kotzebue. To the south and west the break-up appeared to be on schedule. With the weather having broken, however, the season advanced very rapidly creating optimum nesting conditions. Except for a small flooded area on the Iditarod Flats adjacent to the Innoko River the habitat everywhere appeared to be in an ideal condition. A period of unprecedented good weather was experienced during the survey, especially along the Bering Sea coast from Bristol Bay northward. Not one day was lost to weather and consequently the survey was accomplished in the shortest period of time to date.

Breeding Population Indices

Overall there was no significant change in the total breeding population index. There were changes of definite significance in relative abundance of the various species, however, and in geographical distribution. Scoter, eider and old squaw showed large reductions particularly on the Yukon Delta and in Bristol Bay. Likewise scaup were reduced to a marked degree in these two areas, but an increase of scaup elsewhere, held the total scaup reduction to about ten percent. There was a sizeable reduction of widgeon in the coastal areas with moderate increases in the interior not sufficient to offset the coastal losses. Widgeon were down about 40 percent. Teal and shoveller also showed a loss but they are tallied in insignificant numbers.

Pintail, mallard, canvasback and goldeneye made remarkable gains even in the coastal areas where the other species declined. The gain or loss indicated in each area of reference is for total ducks, game and non-game species combined.

Under ideal weather conditions an intensive coverage of the Yukon Delta brant nesting area was flown on May 31. Very few brant were present at the time although the cackling geese appeared to be in normal abundance. Refuge Supervisor Spencer estimated about 40,000 brant at Izembek Bay on May 27, however. This appears to be a rather delayed migration for the species.

It was very apparent during the survey that the isolated, normally marginal habitat lying outside the boundaries of the survey areas was supporting many more mallards, pintail

ALASKA - Continued

and scaup than ordinarily. There is no way of assessing this increment to the breeding population quantitatively, in the aggregate the total increase must be quite significant. What the production success might be in these marginal areas is problematical.

Table 1. Statistical Summary - Alaska Waterfowl Breeding Population, 1958 vs. 1959

| Stratum Number | Location | Area Sq. Mi. | No. of 16-mi. x-sects | Sq. Mi. Sampled | Mean Density Ducks per Sq. Mi. | | Population Index | | Population Index | |
|-------------------|------------------|-----------------|-----------------------------|--------------------|-----------------------------------|------|------------------|-----------|------------------|------------|
| | | | | | 1958 | 1959 | Total Ducks | 1958 | 1959 | Game Ducks |
| II | Tanana-Kuskokwim | 8,900 | 17 | 68 | | | | | | |
| | Nelchina | 2,250 | 6 | 24 | | | | | | |
| | Innoko | 1,000 | 2 | 8 | | | | | | |
| | Kenai-Susitna | 3,000 | 10 | 40 | | | | | | |
| | Total | 15,150 | 35 | 140 | 5.5 | 8.4 | 83,530 | 127,440 | 70,165 | 109,855 |
| III | Nelchina | 1,750 | 7 | 28 | | | | | | |
| | Ft. Yukon | 3,000 | 5 | 20 | | | | | | |
| | Koyukuk | 4,650 | 10 | 40 | | | | | | |
| | Bristol Bay | 9,200 | 15 | 60 | | | | | | |
| | Innoko | 2,500 | 6 | 24 | | | | | | |
| | Yukon Delta | 17,500 | 34 | 136 | | | | | | |
| | Noatak | 550 | 2 | 8 | | | | | | |
| | Seward Pen. | 2,000 | 8 | 32 | | | | | | |
| | Bettles | 1,200 | 4 | 16 | | | | | | |
| | Total | 42,350 | 91 | 364 | 17.7 | 14.3 | 751,280 | 604,870 | 521,560 | 460,910 |
| IV | Ft. Yukon | 2,800 | 14 | 56 | | | | | | |
| | Yukon Delta | 8,700 | 15 | 60 | | | | | | |
| | Kotzebue Sd. | 4,800 | 11 | 44 | | | | | | |
| | Norton Bay | 700 | 5 | 20 | | | | | | |
| | Total | 17,000 | 45 | 180 | 33.2 | 36.0 | 564,065 | 612,035 | 421,400 | 516,500 |
| V | Minto | 950 | 6 | 24 | | | | | | |
| | Northway | 700 | 7 | 28 | | | | | | |
| | Copper Delta | 300 | 5 | 20 | | | | | | |
| | Total | 1,950 | 18 | 72 | 40.2 | 52.1 | 78,400 | 101,680 | 77,400 | 99,950 |
| ALASKA TOTAL | | 76,450 | 189 | 756 | 19.3 | 18.9 | 1,477,275 | 1,446,025 | 1,090,525 | 1,187,215 |

Table 2. Waterfowl Population Index, Alaska - Comparative Data 1958 - 1959

| Species | Stratum II | | Stratum III | | Stratum IV | | Stratum V | | Total | | |
|------------|------------|---------|-------------|---------|------------|---------|-----------|---------|-----------|-----------|--------|
| | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | Trend |
| Scaup | 37,340 | 41,800 | 258,750 | 184,485 | 265,700 | 261,950 | 25,700 | 44,535 | 587,490 | 532,770 | - 10% |
| Pintail | 15,035 | 30,075 | 132,785 | 229,850 | 109,500 | 195,250 | 15,290 | 18,920 | 272,610 | 474,095 | + 74% |
| Mallard | 4,425 | 22,690 | 22,000 | 27,825 | 17,500 | 27,550 | 19,050 | 20,235 | 62,975 | 98,300 | + 56% |
| Widgeon | 1,750 | 6,500 | 31,110 | 6,650 | 15,800 | 17,750 | 4,000 | 1,425 | 52,660 | 32,325 | - 39% |
| Bufflehead | 7,190 | 5,860 | 1,520 | 2,420 | 2,800 | 3,000 | 7,130 | 6,915 | 18,640 | 18,195 | Same |
| Shoveller | | | 2,280 | 3,025 | 5,600 | 2,450 | 1,650 | 2,540 | 9,530 | 8,015 | - 15% |
| Teal | 1,750 | | 760 | 1,210 | 1,700 | | 2,575 | 1,220 | 6,785 | 2,430 | - 64% |
| Goldeneye | 2,675 | 2,930 | 835 | 3,630 | 1,700 | 600 | 1,000 | 1,220 | 6,210 | 8,380 | + 35% |
| Canvasback | | | 1,520 | 1,815 | 1,100 | 7,350 | 775 | 2,540 | 3,395 | 11,705 | + 245% |
| Gadwall | | | | | 600 | | 230 | 400 | 230 | 1,000 | + 335% |
| Scoter | 13,365 | 17,585 | 221,560 | 116,740 | 88,000 | 47,135 | 1,000 | 1,730 | 323,925 | 183,190 | - 43% |
| Old Squaw | | | 78,160 | 27,220 | 29,900 | 31,850 | | | 108,060 | 59,070 | - 45% |
| Eider | | | | | 24,200 | 16,550 | | | 24,200 | 16,550 | - 31% |
| Merganser | | | | | 565 | | | | 565 | | |
| TOTAL | 83,530 | 127,440 | 751,280 | 604,870 | 564,065 | 612,035 | 78,400 | 101,680 | 1,477,275 | 1,446,025 | - 6% |

ALASKA - continued

Production Indices

Production surveys were confined to three rather small areas. One team of two biologists intensively covered a 2-square mile study area on the Copper River Delta, beginning in late April. A second team covered a study area in the Tetlin-Northway district beginning in mid-June. On July 2, an aerial survey was made of black brant production in the vicinity of Hazen and Igiak Bays on the Yukon Delta.

On the Copper Delta study area 224 Canada goose nests and 115 duck nests of six species were observed. Hatching success was 82.3 percent for the geese and 67.3 percent for the ducks with several scaup nests still under incubation. The geese averaged 5.7 eggs per nest. Through the 10th of July 50 broods of ducks had been tallied in this area for an average brood size of 5.9, slightly smaller broods than last year, but maybe too small a sample to be significant. It is interesting to note that canvasback broods were observed, a new nesting record for the Copper Delta, and there was a high incidence of shoveler broods. In addition, a pair of redhead ducks was observed on both the Copper Delta and Kenai Moose Range. This constitutes a new record for the species in both areas.

As mentioned above, it was mid-June before the biological team arrived at the Tetlin camp to start a production study. From the time of their arrival it was very apparent that the breeding population had increased considerably above that recorded from the aerial survey. A few ruddy ducks, several redheads and many blue-winged teal, all new records for the area, were observed. Through July 20, seven blue-winged teal broods had been recorded averaging 8.0 young. No ruddy nor redhead broods had yet been recorded but two female redheads were flushed from dense clumps of tules on July 15 where they may have been nesting.

Of perhaps greater significance than the new records of southern breeders is the influx of shoveler, green-winged teal and canvasback above the numbers formerly breeding in the area. This could mean that displaced prairie nesters have successfully readjusted to a far northern habitat. Through July 20, 330 complete broods of ten species were recorded at Tetlin. The overall brood size was identical with those of 1958, although the early nesting mallards and pintails had smaller broods. This may have been a result of the late break-up. Scaup, bufflehead and goldeneye broods had just started to appear by mid-July and canvasback, a normally early nesting species, was much later than usual. Of the 24 canvasback broods recorded, 11 were counted on July 15 and 16. All of these were still Class I broods so undoubtedly there are many canvasback still to be hatched judging from the number of adult male moulters. Brood counts for both the Copper Delta and Tetlin-Northway area are summarized in Table 3.

ALASKA - continued

When the breeding population survey was flown on the Yukon Delta May 31 the brant had not yet arrived on their breeding ground. On July 2 Refuge Supervisor Spencer and Game Management Agent Tremblay again flew a rather comprehensive reconnaissance of the brant breeding grounds.

Within the brant area, a calculated 42 square miles of transect was sampled (1.4 hours at 120 mph--168 miles of 1/4 mile strip). Eighty-nine hundred (8900) brant including young were recorded or approximately 210 per square mile.

The brant nesting area was estimated as comprising a strip three (3) miles in width, approximately 135 miles long or about 400 square miles. This resulted in a calculated population of 84,000 or considering likely errors - 70-100,000.

A planimeter measurement of the probably area indicates the brant nesting area to be closer to 250 square miles than 400. This would place the minimum population at about 50,000.

Number of young were recorded for 126 brant broods with an average of 2.8.

Conclusions

In summary, the duck production forecast from Alaska is excellent, certainly the best outlook in the past five years at least.

Table 3.

AVERAGE BROOD SIZE
(All Age Classes Combined)

| SPECIES | COPPER DELTA | | TETLIN-NORTHWAY | |
|--------------|-----------------|-----------------|------------------|------------------|
| | 1958 | 1959 | 1958 | 1959 |
| Mallard | 1 (7.0) | 2 (5.0) | 37 (8.0) | 58 (6.3) |
| Pintail | 1 (4.0) | 22 (5.2) | 23 (7.1) | 60 (6.4) |
| Widgeon | 1 (5.0) | | 42 (7.3) | 41 (7.4) |
| Shoveler | 2 (4.0) | 14 (6.4) | 5 (7.6) | 23 (8.8) |
| Gr-W. Teal | 1 (6.0) | 1 (7.0) | 45 (7.2) | 82 (7.1) |
| Bl-W. Teal | | | | 7 (8.0) |
| Scaup | 4 (9.5) | 6 (6.5) | 50 (7.4) | 12 (10.1) |
| Canvasback | | 4 (5.8) | 22 (7.1) | 24 (7.0) |
| Bufflehead | | | 30 (7.0) | 13 (7.0) |
| Goldeneye | 9 (5.4) | 1 (8.0) | 5 (6.2) | 2 (6.0) |
| Unidentified | 5 (7.0) | | | 8 (6.0) |
| TOTAL | 24 (6.3) | 50 (5.9) | 276 (7.1) | 330 (7.1) |

NORTHERN ALBERTA AND THE NORTHWEST TERRITORIES

Weather and Water Conditions

This is the most retarded spring throughout the north ever encountered in our surveys, and, in fact, since records have been kept. By the time we reached McMurray temperatures dropped below freezing almost every night and on one night it dropped to 19° F. The barrens were completely frozen and on all transects approaching the edge of the barrens open water was at a premium. Even so, enough open water was present to allow the waterfowl to move in.

Surface water on the first two transects, the most southerly, had deteriorated considerably since last year, only the deeper permanent ponds and lakes holding water. North of there surface water improved gradually until normal conditions were encountered at about 60° N. latitude and were actually better than average in the Slave River Parklands.

All rivers were low - consequently there had been no flooding in the Athabasca Delta. Moreover, due to the small snow pack in the mountains it is doubtful if the Delta will flood this spring, which will be a considerable boon to all waterfowl attempting production there.

Breeding Population Indices

Table 1 represents a comparison of the entire survey area with the 1958 population. All species of ducks increased substantially with the exception of goldeneye, which showed only a slight increase, mergansers which showed a slight decrease, and canvasback which decreased 24 percent. Mallards, baldpate, pintails, and shovellers, however, more than doubled in number and no doubt represent displaced ducks from prairies.

With the exception of snow geese, we do not regard indicated changes in the goose population as particularly significant.

An interesting sidelight on snow goose nest predation was the presence of barren ground grizzly bears on the snow goose nesting islands. Last year Tom Barry found two bears on the Anderson delta, which destroyed numerous nests during their stay there. This year we sighted two grizzly bears on a goose nesting island on the Mackenzie delta, and while we did not actually see them in the process of eating eggs, it is safe to assume that is what they were there for; and any animal as large as a grizzly is capable of consuming a considerable number of eggs!

NORTHERN ALBERTA AND THE NORTHWEST TERRITORIES - Continued

The lone drake index in 1958 was 60 percent. This year it was only 35 percent which is interpreted to mean that relatively few of the total birds seen were attempting to nest at the time of the survey. It is possible that this is more a reflection of the late season than of a difference in production success for the season.

Table 1. Total Population Estimates by Species for 1958 and 1959 - Northern Alberta and the Northwest Territories

| Species | 1958 | 1959 | Percent Change |
|-----------------------|-----------|-----------|----------------|
| <u>Dabbling Ducks</u> | | | |
| Mallard | 776,900 | 1,254,700 | + 61 |
| Pintail | 453,200 | 1,002,500 | + 121 |
| Baldpate | 205,000 | 426,700 | + 108 |
| G. W. Teal | 122,200 | 281,100 | + 130 |
| Shoveler | 100,300 | 187,600 | + 87 |
| B. W. Teal | 47,700 | 105,300 | + 121 |
| Gadwall | 1,700 | 2,700 | + 60 |
| Sub-Total | 1,707,000 | 3,260,600 | + 91 |
| <u>Diving Ducks</u> | | | |
| Scaup | 1,304,800 | 2,055,800 | + 57 |
| Goldeneye | 233,900 | 245,400 | + 5 |
| Bufflehead | 120,700 | 206,000 | + 71 |
| Canvasback | 80,900 | 60,900 | - 24 |
| Ringneck | 42,400 | 130,700 | + 208 |
| Redhead | 13,900 | 77,800 | + 406 |
| Ruddy | 12,700 | 27,100 | + 113 |
| Sub-Total | 1,809,300 | 2,803,700 | + 55 |
| <u>Misc. Ducks</u> | | | |
| Scoter | 752,000 | 1,299,700 | + 71 |
| Old Squaw | 207,300 | 284,800 | + 37 |
| Merganser | 155,400 | 145,900 | - 6 |
| Sub-Total | 1,114,700 | 1,730,400 | + 55 |
| <u>Geese</u> | | | |
| Canada Goose | 52,400 | 93,300 | + 78 |
| Snow Goose | 9,500 | 7,700 | - 23 |
| W. F. Goose | 800 | 10,000 | + 1150 |
| Sub-Total | 62,700 | 111,000 | + 77 |
| Brant | 50 | 3,000 | + 500 |
| Swan | 13,300 | 45,400 | + 240 |

NORTHERN ALBERTA AND THE NORTHWEST TERRITORIES

Production Indices

As of publication date, the only indication of production success that is available from northern Alberta and the Northwest Territories is a report from the aerial survey crew which stated that as of July 28, broods were just beginning to make their appearance. During three other years when July surveys have been conducted (1951, 1952, and 1954) most of the broods of early nesting species were already on the water by this date and many had reached 3 to 5 weeks of age. Since both the mallard and pintail are normally early nesters, it is believed that production success for at least these two species will be small.

Conclusions

Although it is estimated that production success will be well below normal for the bulk of the birds which moved into the area this year, the very large increase in adult birds will result in a moderate increase in fall flight as compared to last year.

BRITISH COLUMBIA

On July 28 a wire was received from R. H. Mackay, Wild Life Biologist, Vancouver, as follows:

"U. S. BUREAU OF SPORT FISHERIES AND WILD LIFE,
WASHINGTON, D. C. WEATHER AND WATER CONDITIONS
IN BRITISH COLUMBIA SATISFACTORY TO WATER FOWL
PRODUCTION TO DATE. SEASON TEN DAYS RETARDED
THIS YEAR. MID-SUMMER WATER FOWL COUNTS SHOW
CONSIDERABLE INCREASE IN BLUE-WINGED TEAL
REDUCTIONS IN MALLARDS LESSER SCAUP AND GOLDEN-
EYE. LITTLE CHANGE IN TOTAL NUMBERS OF DUCKS
COUNTED."

Conclusions

The fall flight of ducks from British Columbia will be about the same as last year.

SOUTHERN ALBERTA

Weather and Water Conditions

At the beginning of the current waterfowl season, the number of potholes present in stratum A and B was less than during July in 1958. In stratum C winter and spring storms served to raise the number of potholes back to the spring level of 1958. This was insufficient to significantly effect the provincial totals and the current nesting season's complement of potholes was less than the July count of 1958. Over the past three years, we have had a trend towards drier conditions, but these data show the rapid acceleration which had occurred to present the condition at the start of the 1959 breeding season.

Table 1 summarizes the pothole indices for May and July of the current year. Comparisons with the previous year and with the long-time average are also indicated. Drastic reductions are shown for both May and July and these are at the 50 percent level. Stratum C was the only area to maintain itself and July ponds for this showed a 28 percent increase over last year. Being a small strata, its effect is easily masked by poor conditions elsewhere and provincial water indices for May showed a reduction of 47 percent from 1958 and 37 percent from the long-time average. Provincial indices for July were similar, revealing a 51 percent reduction from last year and a 35 percent reduction from the long-time average.

This year the number of water areas was a critical factor, critical to both breeding birds and to production. Some areas were completely dry and afforded no chance for waterfowl. Others were dry enough to cause mass failure of the nesting efforts of breeding pairs. Limited areas in the southwestern prairies, the Cypress Hills and extreme northern parklands had water conditions where waterfowl breeding activities proceeded in normal fashion.

Breeding Population Indices

Tables 2 and 3 summarize 1959 waterfowl indices by species, stratum and Province. Comparisons are given between last year and our 8-year average. The provincial breeding population index for southern Alberta has remained constant with that of 1958 and is still well above our 8-year average.

Pintails are still in a declining trend. From our highest index of 1952 we have witnessed a steady decline until this year the index was 19 percent below average. This was held up 5-10 percent by an increase of 18 percent in stratum C over

SOUTHERN ALBERTA - Continued

the 1958 index. A significant decrease was found for blue-winged teal. This reduction amounted to 85 percent in the favored parkland habitat. Despite a sizeable increase in stratum C the provincial index dropped 49 percent. Of the diving ducks, canvasback and redheads decreased - canvasback to a significant 45 percent.

On the contrary the mallard continues an upward trend though somewhat blunted from previous years. The mallard has now assumed dominance in strata A and B and do-dominance in stratum C. Forty-one percent of observed waterfowl are mallards. Baldpate and gadwall have made significant increases as have several of the minor species of puddle ducks and diving ducks.

Late or early seasons are reflected to a degree by the lone male segment of the early nesting species. These data are summarized in Table 4.

Breeding populations based on gross indices gave figures equal to 1958. Actually the 1959 index represents a reduction from 1958 because the factors of visibility were greatly increased as ducks were concentrated on fewer water bodies and many of the potholes had bare mud-flats which offered little concealment. This increased visibility applies equally to broods. Normally aerial crews observe about 40 percent of the existing populations in Alberta. This year aerial crews were able to observe about 60 percent.

Production Indices

Table 6 represents a summation of aerial production data for 1959. Gross indices show strata A, B, and C to be 61 percent below, 51 percent below and 90 percent above last year, respectively. The increase of broods in stratum C, because of the small numbers of broods represented, had little effect and the provincial index was reduced 48 percent over 1958. When the relative visibility of the two years is considered, the decreases for 1959 become even greater. The current indices are without doubt the lowest ever recorded for the survey area in Alberta.

This reduction has been severe enough to affect all species, but particularly our mallards, pintails and diving ducks. As a result, the fall flight from the survey area in Alberta could be reduced to approximately one-third of the flight of 1958.

SOUTHERN ALBERTA - Continued

The above remarks apply equally to coots. The brood index for this species decreased by approximately 72 percent.

Conclusions

While breeding pair indices were sufficiently high to offer adequate production possibilities, they never materialized and our fall flight from Alberta will show a great decrease. This decrease will approximate 60 percent.

Table 1. Water Areas on Aerial Transects-Alberta
STRATUM A

| | May | | July | | |
|--------------|--------|--------|---------|--------|--------|
| Average | 1958 | 1959 | Average | 1958 | 1959 |
| Total Ponds: | | | | | |
| Seen | 3036 | 1563 | | 1622 | 1114 |
| Ponds Per | | | | | |
| Square Mile | 11.50 | 5.94 | | 6.16 | 4.23 |
| Index | 316870 | 254720 | 131136 | 213665 | 136086 |
| Per Cent | | | -51* | | -31 |
| Change | | | -59** | | -56 |

STRATUM B

| | | | | | |
|--------------|--------|--------|--------|--------|--------|
| Total Ponds: | | | | | |
| Seen | 3118 | 1832 | | 2043 | 1063 |
| Ponds Per | | | | | |
| Square Mile | 16.50 | 9.89 | | 10.81 | 5.34 |
| Index | 511475 | 430596 | 252999 | 328310 | 282138 |
| Per Cent | | | -41 | | -51 |
| Change | | | -51 | | -57 |

STRATUM C

| | | | | | |
|--------------|--------|--------|--------|-------|-------|
| Total Ponds: | | | | | |
| Seen | 638 | 637 | | 281 | 386 |
| Ponds Per | | | | | |
| Square Mile | 7.46 | 7.45 | | 3.29 | 4.57 |
| Index | 128778 | 120225 | 120036 | 78640 | 52952 |
| Per Cent | | | 0 | | +28 |
| Change | | | -7 | | -6 |

PROVINCE

| | | | | | |
|--------------|--------|--------|--------|--------|--------|
| Total Ponds: | | | | | |
| Seen | 6792 | 4032 | | 3946 | 2563 |
| Ponds Per | | | | | |
| Square Mile | 12.63 | 7.50 | | 7.34 | 4.77 |
| Index | 956598 | 805541 | 504171 | 620649 | 471176 |
| Per Cent | | | -37 | | *35 |
| Change | | | -47 | | -51 |

*Percent change from previous year

**Percent change from average

Table 2. Waterfowl Indices by species, 1958 and 1959.

| | Stratum A | | | Stratum B | | | Stratum C | | | Province | | |
|------------|-----------|--------|----------------|-----------|--------|----------------|-----------|--------|----------------|----------|---------|----------------|
| | 1958 | 1959 | Percent Change | 1958 | 1959 | Percent Change | 1958 | 1959 | Percent Change | 1958 | 1959 | Percent Change |
| Pintail | 332580 | 261432 | - 22 | 165444 | 124428 | - 25 | 153579 | 181656 | + 18 | 651603 | 567516 | - 13 |
| Mallard | 383255 | 396427 | + 3 | 652108 | 717015 | + 9 | 158666 | 181279 | + 14 | 1194029 | 1294721 | + 8 |
| Baldpate | 68798 | 79034 | + 14 | 91008 | 141611 | + 56 | 19221 | 33731 | + 75 | 179027 | 254376 | + 42 |
| Shoveller | 97240 | 68882 | - 29 | 94184 | 102332 | + 9 | 25251 | 32600 | + 29 | 216675 | 203814 | - 6 |
| Gadwall | 29952 | 30036 | 0 | 43363 | 88108 | +103 | 5842 | 9045 | + 55 | 79157 | 127189 | + 60 |
| Bw. Teal | 54283 | 58739 | + 8 | 114623 | 17661 | - 85 | 4899 | 12249 | +150 | 173865 | 88640 | - 49 |
| Cinn. Teal | 336 | 419 | + 25 | - | - | - | - | 377 | - | 336 | 796 | +137 |
| Gw. Teal | 8977 | 5537 | - 38 | 24444 | 56897 | +133 | 942 | 9234 | +900 | 34363 | 71668 | +108 |
| Scaup | 97240 | 94471 | - 3 | 174696 | 205355 | + 18 | 36746 | 26382 | - 28 | 308682 | 326208 | + 6 |
| Canvasback | 8558 | 9984 | + 17 | 78303 | 39497 | - 50 | 7160 | 2073 | - 71 | 94021 | 51554 | - 45 |
| Redhead | 16360 | 12417 | - 24 | 42811 | 34111 | - 20 | 3769 | 10741 | +184 | 62940 | 57267 | - 9 |
| Ruddy | 3104 | 9145 | +195 | 11739 | 15329 | + 31 | 754 | 8291 | +1000 | 15597 | 32765 | +105 |
| Bufflehead | 1846 | 1426 | - 23 | 18644 | 24720 | + 33 | 942 | 1319 | + 40 | 21432 | 27465 | + 28 |
| Goldeneye | 419 | 419 | 0 | 1933 | 1657 | - 14 | 754 | 1130 | + 50 | 3106 | 3206 | + 3 |
| Ringneck | 336 | 419 | + 25 | 276 | 3867 | +1301 | - | - | - | 612 | 4286 | +600 |
| Scoter | 1175 | 587 | - 50 | 31073 | 54964 | + 77 | - | - | - | 32248 | 55551 | + 72 |
| Coot | 21017 | 32092 | + 52 | 46263 | 45849 | - 1 | 6972 | 52763 | + 76 | 74252 | 130704 | + 76 |

Table 3. 1959 Waterfowl Indices Compared to Eight Year Average

| | Stratum A | | Stratum B | | Stratum C | | Province | |
|------------|---------------|---------|---------------|---------|---------------|---------|---------------|---------|
| | 8 Yr. | Percent |
| | Average: 1959 | Change |
| Pintail | 387548 | 261432 | - 33 | 153765 | 124428 | - 19 | 161796 | 181656 |
| Mallard | 324426 | 396427 | + 22 | 515242 | 717015 | + 39 | 129446 | 181279 |
| Baldpate | 71061 | 79034 | + 11 | 80295 | 141611 | + 76 | 23559 | 33731 |
| Shoveller | 85555 | 68882 | - 19 | 63923 | 102332 | + 60 | 19746 | 32600 |
| Gadwall | 25337 | 30036 | + 18 | 39894 | 88108 | +121 | 5340 | 9045 |
| Bw. Teal | 54182 | 58730 | + 8 | 72730 | 17661 | - 76 | 5807 | 12249 |
| Cinn. Teal | 146 | 419 | +187 | - | - | - | 319 | 377 |
| Gw. Teal | 11086 | 5537 | - 50 | 27058 | 56897 | +110 | 3634 | 9234 |
| Scaup | 92947 | 94471 | + 2 | 126387 | 205355 | + 62 | 27780 | 26382 |
| Canvasback | 10104 | 9984 | - 1 | 41214 | 39497 | - 4 | 3981 | 2073 |
| Redhead | 15346 | 12417 | - 19 | 29918 | 34111 | + 14 | 8276 | 10741 |
| Ruddy | 5200 | 9145 | + 76 | 10846 | 15329 | + 41 | 2111 | 8291 |
| Bufflehead | 1795 | 1426 | - 21 | 14339 | 24720 | + 72 | 684 | 1319 |
| Goldeneye | 635 | 419 | - 34 | 2047 | 1657 | - 19 | 995 | 1130 |
| Ringneck | 252 | 419 | + 66 | 1026 | 3867 | +277 | | |
| Scoter | 1342 | 587 | - 56 | 37114 | 54964 | + 48 | | |
| Coot | 33359 | 32092 | - 4 | 46780 | 45849 | - 2 | 18432 | 52763 |

SOUTHERN ALBERTA - Continued

Table 4. Percent Lone Males in Early Nesting Species
(Pintail, Mallard and Canvasback)

| Year | Stratum A | Stratum B | Stratum C | Province |
|---------------|-----------|-----------|-----------|----------|
| 1957 | 90% | 92% | 89% | 90% |
| 1958 | 85% | 87% | 76% | 85% |
| 1959 | 75% | 68% | 70% | 71% |
| 7-Yr. Average | 80% | 83% | 72% | 80% |

Table 5. Aerial Waterfowl Population Indices in 1959 as Compared
to 1958 and to an 8-year Average

| Stratum | 1958 | 1959 | 8-year Average | Percent Change From 1958 Average |
|---------|-----------|-----------|----------------|----------------------------------|
| A | 1,104,459 | 1,029,365 | 1,081,111 | - 7 - 5 |
| B | 1,544,649 | 1,627,552 | 1,188,159 | + 5 + 37 |
| C | 418,525 | 510,107 | 392,363 | + 22 + 30 |
| Total | 3,067,633 | 3,167,024 | 2,661,634 | + 3 + 19 |

Table 6. Aerial Production Data - 1958-1959

| | STRATUM A | | STRATUM B | | STRATUM C | | PROVINCE | |
|---------------|-----------|--------|-----------|--------|-----------|--------|----------|---------|
| | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 |
| Area | | | | | | | | |
| Square miles | 22088 | 22088 | 26300 | 26300 | 16112 | 16112 | 64300 | 64300 |
| Sample | | | | | | | | |
| Square miles | 263.25 | 263.25 | 189.00 | 189.00 | 85.50 | 85.50 | 537.75 | 537.75 |
| Total broods: | | | | | | | | |
| seen | 1218 | 565 | 1925 | 1107 | 48 | 127 | 3191 | 1799 |
| Broods per | | | | | | | | |
| Square mile | 4.63 | 2.14 | 10.18 | 5.81 | 0.56 | 1.48 | 5.93 | 3.48 |
| Est. No. of | | | | | | | | |
| Broods | 102267 | 47403 | 265698 | 152877 | 9023 | 23932 | 376988 | 224232 |
| Pot. later | | | | | | | | |
| Broods | 154 | 188 | 46 | 89 | 47 | 70 | 247 | 347 |
| Pot. Broods | | | | | | | | |
| per Sq. Mi. | 0.58 | 0.71 | 0.24 | 0.47 | 0.55 | 0.82 | 0.46 | 0.64 |
| No. of Pot. | | | | | | | | |
| Later Broods | 12811 | 15773 | 6264 | 12291 | 8862 | 13191 | 27937 | 41255 |
| Brood Index | 115078 | 63176 | 271962 | 165168 | 17885 | 37123 | 404925 | 265467 |
| Ind. Brds. | | | | | | | | |
| Per Sq. Mi. | 5.21 | 2.85 | 10.42 | 6.28 | 1.11 | 2.30 | 6.30 | 4.12 |
| Average | | | | | | | | |
| Brood Size | 6.02 | 4.27 | 6.48 | 5.24 | 5.31 | 4.87 | 6.30 | 4.85 |
| Est. No. | | | | | | | | |
| Young | 693920 | 269762 | 1762314 | 865480 | 94969 | 180789 | 2551203 | 1336031 |
| Per Cent | | | | | | | | |
| Change | | -61 | | -51 | | 490 | | -48 |

WASHINGTON

Weather and Water Conditions

Water conditions in eastern Washington are excellent, with an 18% increase in potholes on study transects. Conditions are comparable to the high water levels of 1952.

Breeding Population Indices

The population of breeding waterfowl was one of the largest on record, with increases over 1958 figures ranging from 10% to 40% in various areas.

Production Indices

A cold, damp, very late spring has resulted in a very poor crop of young birds to date, although many birds apparently are still incubating. The transects surveyed show as much as 70% reduction in broods in some areas.

| | 1958 Index | 1959 Index | Change |
|----------------------------|---------------|---------------|--------|
| Ducks - Eastern Washington | 457,900 | 292,300 | - 36% |
| Ducks - Western Washington | <u>82,000</u> | <u>60,300</u> | - 26% |
| <u>Total Ducks</u> | 539,900 | 352,600 | - 34% |
| Coot | 86,400 | 111,200 | + 28% |
| Geese | <u>13,400</u> | <u>13,300</u> | none |
| <u>Total Waterfowl</u> | 639,700 | 477,100 | - 25% |

Conclusions

The over-all reduction in ducks is 34%, because the high population of adults fills in for some of the brood reduction in the fall population.

IDAHO

Weather and Water Conditions

The spring run-off was quite late and generally below normal, with very little flooding noted. The month of April was characterized by above average temperatures and below average precipitation with the situation reversed in May and early June when below average temperatures and above average precipitation was the rule in most sections of the State.

Breeding Population Indices

An aerial count was taken in the major goose nesting areas of the State for the fifth consecutive year. The results as given in Table 1 indicate a 3% reduction in total geese from last year and a 20% increase from the average of the four previous years. Of particular interest is the fact that the count in the Grays Lake-Blackfoot Reservoir-Dingle Marsh complex remained at the high level of 1958.

Production Indices

Canada goose nesting studies were continued in several areas of the State. The results as shown in Table 2 do not indicate total estimated production. They show population trends based on the number of and hatching success of nests found on the same areas covered in the same manner each year. On this basis, the estimated production on four areas with trend information for eight years is 17% below last year and also 17% below the average of the previous six years. The estimated production on six areas with trend data for six years is 10% below last year and 11% below the average for the previous five years. The reduction was due primarily to a drop for the second consecutive year in the production on the Homedale unit. For all practical purposes these birds are non-migratory. The eastern Idaho units showed a 20% increase over last year with the largest proportion occurring in the North Fork Unit.

Duck brood production routes were counted in three areas of the State. The routes were run twice with all classes of broods counted on the first run and only Class I broods counted on the second run. The results are shown in Tables 3 and 4. The southcentral Idaho counts were down 30% from last year and about the same as in 1957. The Camas National Wildlife Refuge counts were only slightly below last year, as were the counts from the Blackfoot Reservoir. It was felt by personnel doing the counting on all three areas that the reductions were due entirely to a delayed hatch. Many of the late nesters, such as redhead and gadwall, were not observed in the numbers that they will be in the next two weeks.

Brood counts to date indicate average survival to Class III size.

IDAHO - continued

Conclusions

It is estimated that the statewide goose production will be slightly lower than last year. The duck production will be the same as last year which was good.

Table 1. Idaho Canada Goose Aerial Count 1955 - 1959

| Area | Pairs | | | | | Groups | | | | | Totals | | | | |
|----------------------------------|-------|------|------|------|------|--------|------|------|------|------|--------|------|------|------|------|
| | 1955 | 1956 | 1957 | 1958 | 1959 | 1955 | 1956 | 1957 | 1958 | 1959 | 1955 | 1956 | 1957 | 1958 | 1959 |
| <u>Snake River Drainage</u> | | | | | | | | | | | | | | | |
| Farewell Bend to Railroad Bridge | 460 | 352 | 459 | 474 | 494 | 248 | 77 | 278 | 236 | 158 | 1168 | 781 | 1196 | 1184 | 1146 |
| Payette River (mouth to Emmett) | 110 | 109 | 120 | 88 | 129 | 41 | 21 | 101 | 169 | 26 | 261 | 239 | 341 | 345 | 284 |
| Strike Dam to (Amer. Falls Dam) | 95 | 56 | 48 | 92 | 40 | 77 | 97 | 34 | 61 | 68 | 267 | 209 | 130 | 245 | 148 |
| North Fork, incl. Island Park | 24 | 37 | 66 | 106 | 103 | 173 | 143 | 148 | 136 | 165 | 221 | 217 | 280 | 348 | 371 |
| 33 South Fork | 48 | 46 | 36 | 59 | 80 | 36 | 9 | 44 | 25 | 16 | 132 | 101 | 116 | 143 | 176 |
| Mud Lake - Camas NWR Area | 96 | 108 | 82 | 108 | 114 | 28 | 19 | 49 | 69 | 70 | 220 | 235 | 213 | 285 | 298 |
| Gray's Lake Area | 124 | 106 | 145 | 176 | 158 | 43 | 70 | 156 | 74 | 85 | 291 | 282 | 446 | 426 | 401 |
| Blackfoot Reservoir Area | 54 | 83 | 113 | 217 | 113 | 198 | 280 | 185 | 73 | 218 | 306 | 446 | 411 | 507 | 444 |
| <u>Bear River Drainage</u> | | | | | | | | | | | | | | | |
| Dingle Marsh Area | 171 | 140 | 269 | 447 | 280 | 132 | 197 | 176 | 160 | 590 | 474 | 477 | 714 | 1054 | 1150 |
| Totals | 1182 | 1037 | 1138 | 1767 | 1511 | 976 | 913 | 1171 | 1003 | 1396 | 3340 | 2987 | 3847 | 4537 | 4418 |

Table 2. Comparison of Goose Production on Idaho Study Areas - 1952 - 1959

| | Glenns Ferry | Homedale | Blackfoot Reservoir | Island Park Reservoir | North Fork Snake River | North Lake | Total * |
|--------------------------|-----------------|----------|------------------------|--------------------------|---------------------------|---------------|-----------|
| No. nests found | | | | | | | |
| 1952 | 24 | 208 | 103 | 16 | - | - | 351 |
| 1953 | 24 | 250 | 121 | 44 | - | - | 439 |
| 1954 | 34 | 216 | 132 | 42 | 39 | 24 | 424(487)* |
| 1955 | 16 | 189 | 117 | 34 | 32 | 31 | 356(419)* |
| 1956 | 15 | 214 | 86 | 38 | 32 | 40 | 353(425)* |
| 1957 | 13 | 253 | 99 | 32 | 35 | 32 | 397(464)* |
| 1958 | 8 | 208 | 89 | 51 | 40 | 31 | 356(427)* |
| 1959 | 9 | 172 | 86 | 51 | 42 | 33 | 318(393)* |
| No. nests hatched | | | | | | | |
| 1952 | 16 | 103 | 75 | 12 | - | - | 206 |
| 1953 | 11 | 180 | 74 | 36 | - | - | 301 |
| 1954 | 9 | 169 | 78 | 36 | 34 | 19 | 292(345)* |
| 1955 | 1 | 125 | 81 | 19 | 21 | 26 | 226(273)* |
| 1956 | 6 | 123 | 61 | 34 | 31 | 34 | 224(289)* |
| 1957 | 8 | 194 | 50 | 23 | 25 | 25 | 275(325)* |
| 1958 | 7 | 151 | 59 | 28 | 35 | 28 | 245(308)* |
| 1959 | 5 | 104 | 57 | 38 | 41 | 25 | 204(270)* |
| Average hatch | | | | | | | |
| 1952 | 5.1 | 4.7 | 4.7 | 4.0 | - | - | 4.7 |
| 1953 | 5.4 | 5.0 | 4.8 | 4.6 | - | - | 4.9 |
| 1954 | 4.6 | 5.5 | 4.5 | 4.1 | 4.8 | 4.4 | 5.0(5.0)* |
| 1955 | 4.0 | 4.8 | 4.8 | 2.7 | 4.5 | 5.2 | 4.6(4.6)* |
| 1956 | 6.0 | 5.1 | 5.3 | 5.4 | 4.9 | 5.1 | 5.2(5.2)* |
| 1957 | 5.1 | 5.3 | 4.0 | 4.1 | 5.5 | 4.7 | 5.0(5.0)* |
| 1958 | 6.3 | 5.3 | 4.5 | 4.3 | 4.1 | 4.3 | 5.0(4.9)* |
| 1959 | 5.8 | 5.2 | 4.8 | 4.7 | 5.2 | 4.6 | 5.0(5.0)* |

Table 2. Comparison of Goose Production on Idaho Study Areas - 1952 - 1959 - Continued

| | Glenns Ferry | Homedale | Blackfoot Reservoir | Island Park Reservoir | North Fork Snake River | North Lake | Total * |
|-----------------------------|-----------------|----------|------------------------|--------------------------|---------------------------|---------------|-------------|
| Estimated production | | | | | | | |
| 1952 | 82 | 484 | 352 | 48 | - | - | 966 |
| 1953 | 60 | 900 | 355 | 166 | - | - | 1481 |
| 1954 | 41 | 930 | 351 | 148 | 154 | 80 | 1470(1704)* |
| 1955 | 4 | 601 | 387 | 52 | 94 | 130 | 1044(1268)* |
| 1956 | 36 | 627 | 323 | 185 | 152 | 173 | 1171(1496)* |
| 1957 | 41 | 1030 | 201 | 95 | 136 | 118 | 1367(1621)* |
| 1958 | 44 | 798 | 267 | 121 | 145 | 121 | 1230(1496)* |
| 1959 | 29 | 541 | 274 | 179 | 213 | 115 | 1023(1351)* |

* Excluding North Fork and North Lake
 ()* Including North Fork and North Lake

Table 3. Southcentral Idaho Duck Production Trend Routes 1957-1958

Table 4. Southeastern Idaho Duck Production Trend Routes 1953 - 1959*

| Trend Route | Year | Number of Broods by Species | | | | | | | | | | | | |
|------------------------|------|-----------------------------|--------------|---------------|--------------|----------------|--------------|---------------|--------------|--------------|--------------|-------|-----------------|-------|
| | | B.W./ Can- | | | | | | | | | | | | |
| | | Mal- lard | Pin- tail | Bald- pate | Gad- wall | Shov- eller | G.W. Teal | Cinn. Teal | vas- Teal | Red- back | Red- head | Ruddy | Lesser Scaup | Unid. |
| Camas NWR | 1953 | 9 | 4 | 1 | 7 | 1 | 1 | 1 | - | 17 | 9 | 4 | 9 | 63 |
| | 1954 | 22 | 4 | - | 9 | - | 1 | 2 | 1 | 4 | 3 | 8 | 10 | 64 |
| | 1955 | 6 | 2 | - | 8 | 2 | - | 3 | - | 3 | - | 5 | 9 | 33 |
| | 1956 | 19 | 4 | 3 | 7 | 1 | - | 1 | - | 14 | 4 | 6 | 30 | 89 |
| | 1958 | 14 | 3 | 1 | 5 | 2 | 1 | 3 | 1 | 10 | 1 | 7 | 8 | 56 |
| | 1959 | 14 | 3 | 2 | 3 | 2 | 1 | 7 | 2 | 9 | - | - | 11 | 54 |
| Black- foot Res. | 1953 | 14 | 6 | 4 | 28 | - | 1 | - | - | - | - | 12 | 13 | 78 |
| | 1954 | 14 | 4 | 4 | 33 | - | 1 | 5 | - | 5 | - | 8 | 4 | 78 |
| | 1955 | 12 | 2 | 6 | 23 | - | 1 | 7 | - | 3 | - | 6 | 5 | 65 |
| | 1956 | 8 | - | 11 | 41 | - | - | 3 | - | - | - | 12 | 4 | 79 |
| | 1958 | 28 | 8 | 10 | 54 | - | 1 | 2 | - | 1 | - | 8 | 13 | 125 |
| | 1959 | 30 | 20 | 18 | 15 | - | 7 | 4 | 1 | 1 | - | 2 | 14 | 112 |

* No routes were censused in 1957.

CALIFORNIA

Weather and Water Conditions

After three consecutive years of above normal precipitation, water conditions in northeastern California fell below normal in 1959. California experienced an extremely dry spring and many of the smaller reservoirs and lakes had become dry by the first of June.

The central valleys received less than normal rainfall this year. There was no flooding of the rivers, and areas flooded last year were dry again this year.

Breeding Population and Production Indices

A comparative summary of nesting pairs of waterfowl for the past four seasons, together with final fall population including young plus resident adults, is shown in the following tables. In almost all cases the figures shown for "nesting pairs" are more accurate than those indicating "fall population indices."

| Species | Estimated Total Nesting Pairs | | | |
|---------------|-------------------------------|--------|--------|--------|
| | 1956 | 1957 | 1958 | 1959 |
| Mallard | 29,410 | 37,470 | 31,250 | 32,750 |
| Pintail | 1,850 | 2,220 | 6,850 | 3,380 |
| Gadwall | 2,710 | 2,880 | 2,970 | 3,500 |
| Cinnamon Teal | 4,760 | 1,720 | 2,220 | 4,330 |
| Redhead | 4,430 | 2,980 | 2,670 | 3,030 |
| Ruddy Duck | 2,230 | 1,640 | 2,170 | 1,930 |
| Shoveler | 630 | 650 | 2,150 | 1,060 |
| Scaup | 340 | 550 | 710 | 740 |
| Others | 350 | 400 | 450 | 725 |
| Total Ducks | 46,710 | 50,510 | 51,440 | 51,445 |
| Canada Goose | 3,130 | 3,960 | 4,360 | 4,540 |
| Coots | 12,870 | 12,350 | 23,460 | 29,820 |

CALIFORNIA - Continued

| Species | Fall Population Indices | | | |
|-----------------|-------------------------|-------------|-------------|-------------|
| | 1956 | 1957 | 1958 | 1959 |
| Mallard | 136,970 | 150,540 | 146,470 | 150,190 |
| Pintail | 11,530 | 12,860 | 31,030 | 15,560 |
| Gadwall | 21,020 | 22,370 | 22,570 | 20,100 |
| Cinnamon Teal | 33,710 | 9,410 | 10,670 | 18,800 |
| Redhead | 37,790 | 24,480 | 20,900 | 17,080 |
| Ruddy Duck | 15,610 | 10,160 | 12,750 | 8,890 |
| Shoveler | 4,240 | 4,250 | 12,120 | 5,820 |
| Scaup | 2,590 | 4,440 | 5,730 | 4,040 |
| Others | 1,520 | 1,950 | 2,740 | 2,980 |
| Total Ducks | 264,980 | 240,460 | 264,980 | 243,460 |
| Canada Goose | 17,640 | 19,280 | 25,190 | 23,130 |
| Coot | 81,340 | 74,890 | 127,760 | 145,870 |

Conclusions

The number of nesting ducks was almost the same as last year, but production was down so that the fall population decreased nine percent.

A four percent increase in nesting pairs of Canada geese, but an eight percent decrease in the total fall population. Drought conditions had an adverse effect when many marshy meadows, swales and reservoirs became dry and the nesting geese failed to bring off young.

Coots again showed an increase with the nesting population up 27 percent while the fall population increased 15 percent.

NEVADA

Weather and Water Conditions

Precipitation throughout Nevada was considerably less than normal this spring. Mild winter storms in the higher elevations left a very poor mountain snow pack. Reservoir storage was fair to good as of May 1, but heavy releases from storage were made earlier than usual to supplement inadequate streamflow.

Streams in west-central Nevada were forecast to range from about 40 to 65 percent of normal. Flows in the Owyhee and Humboldt Rivers in northeastern Nevada were forecast to be only 18 and 12 percent of normal respectively.

Breeding Population Indices

The following table presents the total nesting pairs recorded during ground and aerial surveys on key waterfowl production areas within the State.*

Nesting Pair Counts on Key Areas

| Species | West-central Nevada | Northeastern Nevada | Total | Percent Abundance |
|--------------|---------------------|---------------------|-------|-------------------|
| Mallard | 750 | 750 | 1,500 | 18.2 |
| Pintail | 280 | 56 | 336 | 4.1 |
| Gadwall | 719 | 296 | 1,015 | 12.3 |
| Cinn. Teal | 1,644 | 326 | 1,970 | 23.9 |
| Redhead | 2,090 | 652 | 2,742 | 33.3 |
| Canvasback | 0 | 100 | 100 | 1.2 |
| Ruddy | 224 | 206 | 430 | 5.2 |
| Shoveler | 59 | 25 | 84 | 1.0 |
| Other Ducks | 14 | 38 | 52 | .6 |
| Total Ducks | 5,780 | 2,449 | 8,229 | |
| Canada Geese | 272 | 124 | 396 | |

* This is the first year for the aerial surveys on these key sample areas and comparable data are not available for past years.

Breeding pair count data for Stillwater, included in the west-central region, are available for past years however, and no change is indicated in the breeding population for this year.

Production Indices

Brood count data for last year are comparable to this years' data in the west-central region and no significant change in production is indicated. A slight decrease may occur as water supplies dwindle throughout the remainder of the summer.

NEVADA - continued

Extreme drought conditions have reduced nesting habitat in northeastern Nevada approximately one half. Practically all reservoirs in this region were lost for this years' production. Wild hay meadows, sloughs and back-water areas along the rivers and streams were nearly dry by the first of May. These areas are normally flooded during the nesting season and constitute the bulk of the nesting habitat in northeastern Nevada. Production is forecast to be down 75 percent for this area.

Conclusions

Extreme drought conditions in northeastern Nevada will probably result in a 75 percent decrease in duck production for this area. Production in west-central Nevada is about normal with a severe reduction in waterfowl habitat foreseen for fall migrants.

UTAH

Weather and Water Conditions

Utah experienced one of her drier springs in 1959. Limited snow packs and lack of the usual spring rains caused some early concern over the prospects for the 1959 waterfowl production. When aerial counts were made, water was extremely limited; however, after the irrigation season began the picture brightened. Periodic fluctuations have dried some areas only to be reflooded with a surge of irrigation returns. At this writing water conditions over the State's marshes are generally lower than in the past few years, but are certainly not considered critical so far as production is concerned.

Breeding Population Indices

Water limitations during the aerial census caused unusual concentrations of waterfowl through some portions of the transects, while other portions were completely dry. Expanded aerial figures differed only slightly from 1958 with a decrease of 1.6 ducks/square mile from the 33.7 figure derived for that season. There were some minor shifts in populations from 1958, but nothing considered important (see Table 1).

Dike-line ground counts conducted on four major State refuges compared very closely with 1958 derivations. Figures for both Ogden Bay Refuge and Clear Lake Refuge were very close to those of a year ago. Both Farmington Bay Refuge and the Public Shooting Grounds showed increases. Probable cause of the larger count on Farmington Bay is an earlier census than in 1958, thus breeding individuals were counted before the break-up and not after males had started concentrating. The increase on the Public Shooting Grounds is attributed to habitat development.

Species wise, 1959 figures compared closely with past trends except that increases were noted in ruddy ducks on all areas. In relation to total population figures, the number of ruddy ducks is still insignificant however.

Apparently the decline in cinnamon teal has halted as all refuges showed an increase in this species over 1958. Blue-winged teal continued to increase slightly; however, this species is still relatively insignificant in Utah's breeding population (see Table 2).

Species composition derived from ground counts was tabulated in two sections. From Utah County north is included in the Northern Section and from there south in the Southern Section. Reason for the break is a distinct variation in habitat and consequent difference in species composition. The only significant change from 1958 occurred in the Southern portion of the State where redheads increased by 6 percent, apparently at the expense of breeding mallards (see Table 4).

Production Indices

Efforts were again exerted to census Canada goose broods in Utah. No attempt was made to census nonbreeding birds or breeding pairs; however, an apparent increase in nonbreeders was observed throughout the State. Whether this was an actual increase or simply a fluctuation at the expense of another area is not known.

Time and personnel limitations prevented census of some areas covered in 1958. Generally, at least on the major production areas, slight increases in broods were noted. Of special importance was the 35-brood increase found on Bear River Refuge (see Table 5). Vegetative growth, time of day census was taken, water conditions, and other factors can cause apparent variations in data from the reservoir habitats of the central portion of Utah, but such fluctuations are not considered significant in comparison of yearly data.

Conclusions

It is estimated that the duck and goose production in Utah will remain approximately the same as last year.

Table 1. Trend Figures Obtained from Aerial Surveys, 1956 - 1959

| Route Flown | Square Miles Sampled | Total Ducks Counted | | | | Ducks/Square Mile | | | |
|--------------------|----------------------|---------------------|--------------|--------------|--------------|-------------------|-------------|-------------|-------------|
| | | 1956 | 1957 | 1958 | 1959 | 1956 | 1957 | 1958 | 1959 |
| Box Elder County | 48.0 | 2,971 | 962 | 2,070 | 1,671 | 61.9 | 20.0 | 43.1 | 34.8 |
| Weber County | 15.5 | 1,119 | 416 | 483 | 573 | 77.2 | 26.8 | 31.8 | 37.0 |
| Davis County | 14.2 | 1,742 | 313 | 342 | 466 | 122.6 | 22.0 | 24.1 | 32.8 |
| Jordan River Clubs | 6.2 | 1,971 | 402 | 400 | 488 | 317.9 | 64.8 | 64.5 | 78.7 |
| Salt Lake County | 6.7 | 201 | 64 | 76 | 55 | 30.0 | 9.6 | 11.3 | 8.2 |
| Utah County | 18.0 | 474 | 113 | 284 | 231 | 26.3 | 6.3 | 15.7 | 12.8 |
| TOTAL | 108.6 | 8,478 | 2,270 | 3,655 | 3,484 | 78.1 | 20.9 | 33.7 | 32.1 |

Table 2. Trends in Dike Line Breeding Pair Counts Made on Four State Refuges, 1956-1959

| Species | Ogden Bay | | | | | Farmington Bay | | | | Public Shooting Grounds | | | | | Clear Lake Refuge | | | |
|---------------|-------------|-------------|-------------|-------------|------------|----------------|------------|------------|------------|-------------------------|------------|------------|------------|------------|-------------------|------|--|--|
| | 1956 | 1957 | 1958 | 1959 | 1956 | 1957 | 1958 | 1959 | 1956 | 1957 | 1958 | 1959 | 1956 | 1957 | 1958 | 1959 | | |
| Canada Geese | 87 | 78 | 95 | 95 | 36 | 36 | 37 | 39 | 12 | 12 | 18 | 10 | 6 | 7 | 2 | | | |
| Mallard | 415 | 337 | 390 | 410 | 30 | 29 | 16 | 36 | 61 | 43 | 46 | 50 | 155 | 287 | 200 | | | |
| Gadwall | 210 | 208 | 215 | 205 | 34 | 31 | 26 | 24 | 18 | 12 | 8 | 21 | 27 | 82 | 66 | | | |
| Pintail | 170 | 96 | 227 | 175 | 41 | 39 | 30 | 64 | 18 | 16 | 93 | 75 | 32 | 177 | 145 | | | |
| Cinnamon Teal | 490 | 429 | 395 | 420 | 102 | 58 | 26 | 40 | 79 | 17 | 7 | 19 | 81 | 112 | 128 | | | |
| Redhead | 475 | 568 | 575 | 550 | 132 | 59 | 29 | 78 | 151 | 114 | 236 | 277 | 36 | 90 | 151 | | | |
| Shoveler | 135 | 129 | 157 | 195 | 28 | 13 | 14 | 9 | 18 | 8 | 6 | 15 | 39 | 117 | 70 | | | |
| G.W. Teal | 15 | 10 | 12 | 5 | 2 | 4 | 1 | 18 | 1 | 2 | 1 | 0 | 17 | 9 | 9 | | | |
| B.W. Teal | 30 | 45 | 61 | 70 | 2 | 1 | 0 | 1 | 1 | 1 | 4 | 2 | 5 | 13 | 22 | | | |
| Ruddy | 85 | 149 | 157 | 160 | 16 | 18 | 8 | 30 | 8 | 9 | 1 | 39 | 24 | 26 | 43 | | | |
| Baldpate | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 6 | 1 | 2 | 6 | | | |
| Goldeneye | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | | |
| Scaup | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 9 | | | |
| Bufflehead | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 1 | | | |
| Canvasback | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | | |
| TOTAL | 2112 | 2049 | 2284 | 2285 | 423 | 289 | 190 | 339 | 367 | 237 | 422 | 518 | 426 | 924 | 911 | | | |

NO RECORD

Table 3. Ground Census Made on Selected Areas in South Central Utah, 1956-1959

| Area | 1956 | | | | 1957 | | | | 1958 | | | | 1959 | | | |
|---------------------------|------|------|------|--------------|------|------|------|--------------|------|------|------|--------------|------|------|------|--------------|
| | Pair | Male | Fem. | Ind. Pop. |
| Clear Lake Refuge | 303 | 78 | 5 | 772 | 157 | 149 | 25 | 662 | 418 | 466 | 33 | 1834 | 434 | 371 | 44 | 1698 |
| Lower Sevier Lake | 85 | 35 | 4 | 248 | 50 | 17 | 1 | 136 | 34 | 28 | 5 | 134 | 81 | 48 | 11 | 280 |
| Gunnison Reservoir | 12 | 2 | 2 | 32 | 8 | 5 | 1 | 28 | 11 | 24 | 0 | 70 | 11 | 11 | 1 | 46 |
| Scipio Lake | 13 | 8 | 0 | 42 | 20 | 15 | 0 | 70 | 53 | 32 | 0 | 170 | 60 | 34 | 21 | 230 |
| Fool's Creek Reservoir | 3 | 6 | 0 | 18 | 4 | 3 | 0 | 14 | 6 | 4 | 0 | 20 | 2 | 2 | 0 | 8 |
| Redmond Lake | 17 | 1 | 0 | 36 | 15* | 9* | 1* | 50* | 17 | 19 | 2 | 76 | 26 | 16 | 3 | 90 |
| Olsen's Slough | 38 | 11 | 6 | 110 | | | | | 19 | 45 | 3 | 134 | 68 | 48 | 7 | 246 |
| Rocky Ford Reservoir | 2 | 10 | 0 | 24 | 6 | 8 | 0 | 28 | 4 | 1 | 0 | 10 | 7 | 8 | 1 | 32 |
| Topaz Marsh | 47 | 23 | 6 | 152 | 16 | 5 | 1 | 44 | 33 | 23 | 4 | 120 | 20 | 36 | 0 | 112 |
| TOTAL | 520 | 174 | 23 | 1434 | 276 | 211 | 29 | 1032 | 595 | 642 | 47 | 2568 | 709 | 574 | 88 | 2742 |

*Census figures for Olsen's Slough and Redmond Lake are combined in the 1957 listings

Table 4. Species Composition of Breeding Populations of Waterfowl in Northern and Southern Utah,
1955 - 1959

| Species | Northern Utah | | | | | Southern Utah | | | | |
|-------------------|---------------|--------|--------|--------|-----------------|---------------|--------|--------|--------|--------|
| | 1955 | 1956 | 1957 | 1958 | 1959 | 1955 | 1956 | 1957 | 1958 | 1959 |
| Redhead | 26.1 | 39.1 | 49.8 | 33.3 | 30.2 | 20.4 | 9.8 | 16.6 | 13.6 | 19.6 |
| Mallard | 20.4 | 18.0 | 14.4 | 16.6 | 16.8 | 33.5 | 31.4 | 32.1 | 31.8 | 23.0 |
| Cinnamon Teal | 21.8 | 15.6 | 10.4 | 13.2 | 15.2 | 22.1 | 20.6 | 19.8 | 10.3 | 12.3 |
| Gadwall | 11.5 | 8.5 | 6.4 | 9.3 | 7.6 | 8.6 | 8.7 | 6.8 | 8.5 | 7.3 |
| Ruddy | 3.4 | 7.9 | 8.4 | 9.3 | 7.6 | 6.7 | 11.5 | 5.5 | 4.7 | 7.5 |
| Pintail | 8.8 | 5.0 | 4.7 | 10.3 | 11.8 | 4.7 | 8.1 | 5.7 | 18.6 | 16.8 |
| Shoveler | 6.2 | 4.9 | 3.4 | 5.7 | 6.9 | 3.1 | 4.9 | 5.9 | 9.1 | 6.6 |
| Blue-winged Teal | 1.1 | 0.6 | 0.2 | 1.7 | 2.3 | 0.2 | 2.8 | 1.0 | 0.9 | 1.9 |
| Green-winged Teal | 0.6 | 0.4 | 1.1 | 0.6 | 1.1 | 0.5 | 1.9 | 5.1 | 1.3 | 2.3 |
| Baldpate | | | 0.3 | | 0.3 | | | 0.5 | 0.5 | 1.3 |
| Scaup | | | 0.9 | | 0.1 | | | 1.0 | 0.7 | 1.2 |
| Bufflehead | | | | 0.1 | | | | | | 0.2 |
| Canvasback | | | | | (1 observation) | | | | | |
| TOTAL | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% | 100.0% |

Table 5. Canada Goose Production in Utah, 1955 - 1959

| | Broods | | | | | Young | | | | |
|------------------------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|-------------|
| | 1955 | 1956 | 1957 | 1958 | 1959 | 1955 | 1956 | 1957 | 1958 | 1959 |
| Round Valley | 8 | **5 | ***20 | *17 | NC | 40 | **28 | ***97 | *77 | NC |
| Cutler | 16 | 14 | 15 | 29 | 20 | 82 | 80 | 81 | 141 | 95 |
| Public Shooting Grounds | 7 | 10 | ***12 | 18 | 10 | 29 | 35 | ***68 | 84 | 55 |
| Bear River Refuge & vicinity | 230 | 320 | 310 | 216 | 261 | 1150 | 1600 | 1400 | *1080 | 1203 |
| Ogden Bay Refuge | 56 | 54 | 61 | 75 | 76 | 240 | 248 | 317 | 360 | 334 |
| Farmington Bay Refuge | 36 | 28 | 36 | 37 | 39 | 162 | 140 | 210 | 191 | 225 |
| Scipio Reservoir | 1 | 6 | 5 | 6 | 3 | 8 | 25 | 24 | 22 | 16 |
| Fool's Creek Reservoir | 2 | 8 | 5 | 11 | 6 | 12 | 48 | 24 | 66 | 32 |
| Redmond Lake | 5 | 10 | 8 | 10 | 6 | 30 | 56 | 45 | 60 | 32 |
| Gunnison Reservoir | 23 | 17 | 18 | 7 | 10 | 102 | 92 | 85 | 38 | 46 |
| Clear Lake Refuge | 4 | 4 | 6 | 7 | 2 | 17 | 19 | 30 | 28 | 9 |
| Stewart Lake Refuge | 7 | NC | 4 | 3 | 0 | 38 | NC | 21 | 16 | 0 |
| Mona Reservoir | NC | 3 | 6 | 6 | 7 | NC | 17 | 33 | 34 | 32 |
| Wales Reservoir | NC | 11 | 3 | 3 | 7 | NC | 49 | 15 | 20 | 37 |
| Rich Co. (Bear River) | NC | NC | 29 | 37 | 37 | NC | NC | 150 | 164 | 172 |
| Otter Creek | NC | NC | NC | 9 | NC | NC | NC | 46 | NC | |
| TOTALS | 395 | 490 | 538 | 491 | 484 | 1910 | 2437 | 2600 | 2427 | 2290 |

*Estimated

**Incomplete counts

***Census method changed in 1957

NC-No count made

OREGON

Weather and Water Conditions

The snow pack in the mountains last winter was the lightest recorded in a number of years. The light run-off in the spring, along with very little rainfall, has resulted in the drying up of many of the potholes of southeastern Oregon and the lowering of water levels in the major marshes. Only one-half of the habitat in Malheur Refuge was available to nesters. Water conditions there are the poorest they have been in 25 years.

Except in Malheur and Harney Counties, the drouth has not had a noticeable effect on reproduction. Although water levels are dropping in Warner Valley, the Klamath Basin and at Summer Lake, they have not reached the critical stage.

Production Indices

Duck broods were very late in showing, with a high percentage of Class I broods being observed in late July.

Production on the areas not affected by the drouth show an increase of 102 percent in ducks and a 15 percent decrease in goose production.

No comparable records are available for the Malheur Refuge, which is rapidly going dry, but, according to the refuge biologist, brood counts indicate the production of ducks will be only about 8 percent of last year's, coots 4 percent, and geese 30 percent of last year's production.

Conclusions

For the entire State, waterfowl production can be summed up as follows: goose production slightly down and duck production about the same as last year. It is felt many of the birds from Malheur failed to breed or sought breeding sites elsewhere. This possible movement to new nesting areas may account for some of the large increase recorded in several of the samples.

WATERFOWL PRODUCTION IN OREGON
(Comparative trends on 45.7 sq. miles)

| Species | No. Broods | | | No. Young | | |
|---------------------|--------------|------------|--------------|--------------|--------------|--------------|
| | 1959 | 1958 | 1957 | 1959 | 1958 | 1957 |
| Mallard | 234 | 120 | 175 | 1,285 | 688 | 1,047 |
| Pintail | 21 | 18 | 20 | 137 | 137 | 119 |
| Gadwall | 72 | 46 | 44 | 518 | 341 | 303 |
| BW/Cinn. Teal | 166 | 38 | 52 | 1,116 | 269 | 311 |
| Shoveler | 2 | 1 | 1 | 14 | 7 | 6 |
| Redhead | 618 | 287 | 715 | 3,437 | 1,653 | 4,632 |
| Canvasback | 46 | 0 | 3 | 276 | 0 | 13 |
| Scaup | 27 | 5 | 11 | 191 | 29 | 66 |
| Ruddy | 117 | 106 | 100 | 727 | 657 | 585 |
| Wood duck | 2 | 0 | 1 | 9 | 0 | 1 |
| Unident. & Misc. | 2 | 6 | 0 | 19 | 36 | 0 |
| TOTAL DUCKS | 1,307 | 627 | 1,122 | 7,727 | 3,817 | 7,083 |
| Canada Goose | 376 | 408 | 409 | 1,630 | 1,914 | 1,816 |

DUCK PRODUCTION TRENDS

| Sample | No. Broods | | | No. Young | | | Av. Size Broods | | |
|-----------------|--------------|------------|--------------|--------------|--------------|--------------|-----------------|------------|------------|
| | 1959 | 1958 | 1957 | 1959 | 1958 | 1957 | 1959 | 1958 | 1957 |
| Klamath Basin | 1,174 | 487 | 948 | 6,808 | 2,748 | 5,887 | 5.8 | 5.6 | 6.2 |
| Summer Lake | 73 | 72 | 43 | 545 | 553 | 327 | 7.5 | 7.7 | 7.6 |
| Silver Lake | 15 | 21 | 50 | 83 | 175 | 362 | 5.5 | 8.3 | 7.2 |
| Paulina Marsh | 14 | 11 | 19 | 98 | 90 | 149 | 7.0 | 8.2 | 7.8 |
| Abert Lake | 24 | 27 | 30 | 162 | 205 | 204 | 6.8 | 7.6 | 6.8 |
| Umatilla County | 7 | 9 | 32 | 31 | 46 | 154 | 4.4 | 5.1 | 4.8 |
| TOTALS | 1,307 | 627 | 1,122 | 7,727 | 3,817 | 7,083 | 5.9 | 6.1 | 6.3 |

CANADA GOOSE PRODUCTION TRENDS

| Sample | No. Broods | | | No. Young | | | Av. Size Broods | | |
|---------------|------------|------------|------------|--------------|--------------|--------------|-----------------|------------|------------|
| | 1959 | 1958 | 1957 | 1959 | 1958 | 1957 | 1959 | 1958 | 1957 |
| Klamath Basin | 236 | 244 | 233 | 1,016 | 1,182 | 1,065 | 4.3 | 4.8 | 4.6 |
| Summer Lake | 67 | 74 | 79 | 283 | 343 | 337 | 4.2 | 4.6 | 4.3 |
| Silver Lake | 47 | 58 | 71 | 212 | 248 | 306 | 4.5 | 4.3 | 4.3 |
| Abert Lake | 26 | 27 | 18 | 119 | 118 | 74 | 4.6 | 4.4 | 4.1 |
| TOTALS | 376 | 409 | 401 | 1,630 | 1,918 | 1,782 | 4.3 | 4.7 | 4.4 |

Central Flyway Data

Waterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1957-58 and 1958-59 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

| Species | 1958-59 | 1957-58 | Percent Change |
|---------------------------|-----------|-----------|-----------------------|
| | | | 1957-58 to 1958-59 |
| Mallard | 1,153,216 | 1,724,199 | - 33.17 |
| G. W. Teal | 409,670 | 651,708 | - 37.14 |
| Pintail | 267,893 | 434,343 | - 38.32 |
| B. W. & Cinn. Teal | 204,198 | 349,875 | - 41.60 |
| Redhead | 81,829 | 180,556 | - 54.68 |
| Canvasback | 78,734 | 144,135 | - 45.37 |
| Shoveler | 74,596 | 125,149 | - 40.39 |
| Gadwall | 37,618 | 64,318 | - 41.51 |
| American Wigeon | 30,106 | 50,757 | - 40.69 |
| Scaup | 39,065 | 92,990 | - 57.99 |
| Ruddy | 10,583 | 5,036 | + 112.13 |
| Bufflehead | 10,091 | 5,036 | + 100.37 |
| Wood Duck | 33,425 | 13,173 | + 153.74 |
| Ring-necked | 43,845 | 21,697 | + 102.08 |
| Merganser | 3,971 | 4,649 | - 14.58 |
| Goldeneye | 7,887 | 3,099 | + 154.50 |
| Black Duck | 901 | 2,324 | - 61.23 |
| Scoter | 1,089 | 1,549 | - 29.70 |
| Others | 1,121 | - | - |
| Total Ducks Retrieved | 2,489,941 | 3,874,593 | - 35.74 |
| Total Ducks not Retrieved | 448,918 | 681,092 | - 34.09 |
| Total Duck Kill | 2,938,859 | 4,555,685 | - 35.49 |
| Canada Goose* | 118,038 | 192,432 | - 38.66 |
| Snow Goose | 58,613 | 61,458 | - 4.63 |
| Blue Goose | 17,936 | 23,965 | - 25.16 |
| White-fronted Goose | 7,719 | 19,475 | - 60.36 |
| Others | 5,763 | - | - |
| Total Geese Retrieved | 208,069 | 297,330 | - 30.02 |
| Total Geese not Retrieved | 37,743 | 32,970 | + 14.48 |
| Total Goose Kill | 245,812 | 330,300 | - 25.58 |
| Total Coots Retrieved | 80,673 | 79,439 | + 1.55 |
| Total Coots not Retrieved | 30,383 | 25,633 | + 18.53 |
| Total Coot Kill | 111,056 | 105,072 | + 5.70 |

* Includes all White-cheeked Geese as Canada Geese.

Central Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill and Daily Bag as Determined by the Waterfowl Hunter Mail Survey.

| | | | Percent Change 1957-58 to 1958-59 |
|---|----------------|----------------|---|
| | 1958-59 | 1957-58 | |
| Number of Potential Hunters | | | |
| 16 and over* | 503,658 | 554,470 | - 9.16 |
| Under 16 | 55,549 | 52,384 | + 6.04 |
| Total | 559,207 | 608,854 | - 8.15 |
| Number of Active Hunters** | | | |
| 16 and over | 424,221 | 479,916 | - 11.61 |
| Under 16 | 45,049 | 41,732 | + 7.95 |
| Total | 469,270 | 521,648 | - 10.04 |
| Average Times Hunted** | | | |
| | 3.569 | 3.933 | - 9.26 |
| Average Seasonal Bag** | | | |
| <u>16 and over</u> | Ducks | 5.640 | + 28.05 |
| | Geese | .479 | + 10.13 |
| | Coots | .175 | + 24.00 |
| <u>Under 16</u> | Ducks | 2.190 | + 18.74 |
| | Geese | .109 | + 17.20 |
| | Coots | .143 | + 61.46 |
| Average Seasonal No. not Retrieved** | | | |
| <u>16 and over</u> | Ducks | 1.000 | + 27.48 |
| | Geese | .087 | + 29.85 |
| | Coots | .067 | + 36.73 |
| <u>Under 16</u> | Ducks | .552 | + 18.71 |
| | Geese | .020 | + 4.76 N.C. |
| | Coots | .043 | + 23.21 |
| Average Daily Bag** | | | |
| <u>16 and over</u> | Ducks | 1.580 | + 20.72 |
| | Geese | .134 | + 1.47 N.C. |
| | Coots | .049 | + 44.12 |
| <u>Under 16</u> | Ducks | .614 | + 10.36 |
| | Geese | .030 | + 25.00 |
| | Coots | .040 | + 57.45 |

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once.

Winter Trend Data - Central Flyway

Weather conditions during the survey period varied from satisfactory to excellent. Fog, low ceilings, and poor visibility were experienced in limited areas but none of these conditions materially interfered with the survey. Generally, the coverage throughout the Flyway was comparable to that of previous surveys.

Based on comparable coverage between 1958 and 1959 there were marked decreases in the wintering populations of mallards, scaup, gadwall, shoveller, and canvasback. Moderate to considerable increases were recorded for pintail, redhead, green-winged teal, and blue-winged teal.

Among the geese, the populations of snow and blue geese decreased considerably, white-fronted goose populations continued to decline, and Canada goose populations remained about stable.

Coot population indices decreased moderately.

At this point it seems appropriate to comment on an apparent discrepancy between population trends of some species as portrayed by the annual winter survey and the population data recorded during breeding ground surveys. For example, the redhead breeding population index reached a peak in 1956. Between 1956 and 1958, the index decreased approximately 40 percent. Between 1958 and 1959, the total breeding population index did not change materially although there was a further exodus of birds out of the important redhead breeding areas in southern Alberta and southern Saskatchewan. Between 1956 and 1958 the winter index decreased 47 percent, which agrees quite well with the 40 percent decrease recorded on the breeding ground. Between 1958 and 1959, however, the total redhead wintering ground index increased 54 percent. Since drought conditions in 1958 adversely affected redhead breeding habitat, and since the 1958 season started off with a much reduced redhead breeding population, it is doubtful that an increase of 54 percent could have occurred. Since the bulk of the wintering redhead are recorded annually in the Central Flyway it does not seem that the 72 percent increase recorded in this Flyway between 1958 and 1959 properly reflects the population trend.

In addition to the redhead, there are differences in the population trends of some other species as measured by the breeding population and wintering ground surveys. At the present time we do not have an explanation for these discrepancies.

Following the tables comparing 1958 and 1959 data is a graph which presents the trend in duck, goose and coot population for the period 1949 through 1959. Survey coverage during the period has not been completely comparable. Therefore, the data have been adjusted to make them as comparable as possible. The adjustments were made by using 1955 and 1959 as base years and then assuming that areas where comparable surveys were conducted provided a measure of percent change from one year to the next. On this basis, population estimates were calculated backwards from the two base years.

In some respects, it appears that the above method of adjusting data for comparability is not entirely adequate. For example, in 1957, it was not possible to conduct the annual winter survey in Mexico and the trend figure for 1957 was calculated on the basis of changes in population observed in the United States only. It does not seem likely that the marked reduction in the duck and coot population recorded in the Central Flyway States in 1957 properly reflected the trend in populations wintering in the Flyway.

Generally speaking, the trend in wintering populations of ducks in the Central Flyway seem to have been slightly upward during the 11-year period, the trend in goose population seems to have been somewhat downward, while the data for coot seems to show that the population has fluctuated markedly. For coot the information may be of questionable value for the purpose of determining population trend.

Percent Change in Central Flyway Population Index Figures
for Ducks, Geese, and Coot - January 1958 to January 1959
(Comparable Coverage)

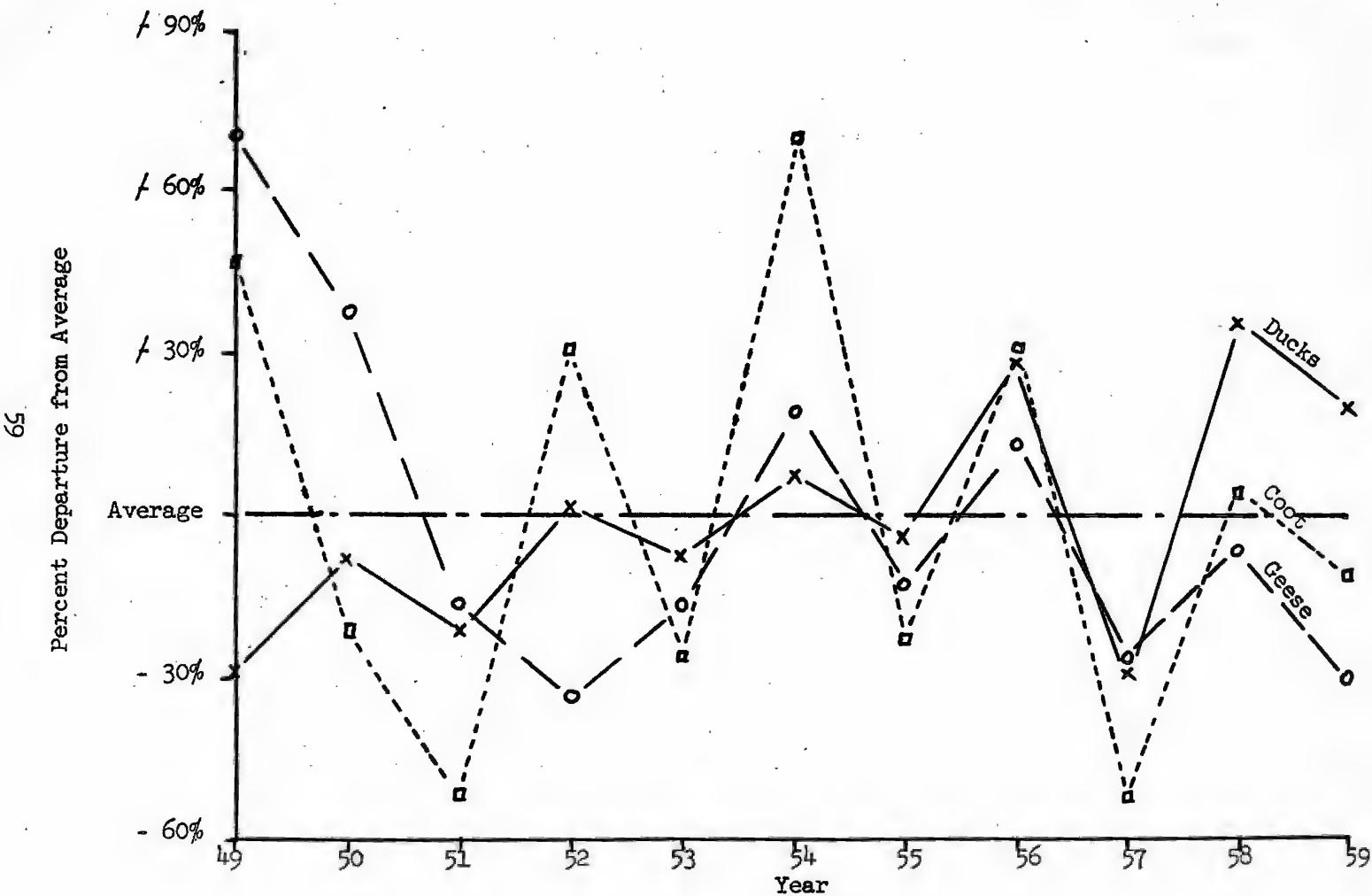
| Area | Ducks | Geese | Coot | Total |
|-----------------------|-------|-------|-------|-------|
| Central Flyway States | - 18 | - 30 | - 10 | - 18 |
| Mexico - Central | + 94 | + 188 | + 293 | + 107 |
| Mexico - East Coast | - 21 | + 144 | - 25 | - 21 |
| TOTAL | - 12 | - 25 | - 15 | - 13 |

Species Composition - Central Flyway - 1958 and 1959
 (Comparable Coverage)

| Species | Percent of Birds Identified | | Percent Change |
|-----------------------|-----------------------------|------|----------------|
| | 1958 | 1959 | |
| <u>Dabbling Ducks</u> | | | |
| Mallard | 45.7 | 30.4 | - 42.1 |
| Pintail | 11.7 | 20.5 | / 52.7 |
| Baldpate | 4.3 | 4.4 | - 11.1 |
| G. W. Teal | 2.7 | 4.9 | / 56.1 |
| B. W. Teal | 2.3 | 3.5 | / 33.6 |
| Shoveler | 1.4 | 1.3 | - 21.1 |
| Gadwall | 1.1 | .8 | - 37.3 |
| Mottled | .1 | Tr. | - 92.1 |
| Wood Duck | Tr. | .1 | / 122.2 |
| Black Duck | Tr. | Tr. | - |
| <u>Sub-Total</u> | 69.3 | 65.9 | - 17.3 |
| <u>Diving Ducks</u> | | | |
| Scaup | 9.3 | 8.3 | - 21.8 |
| Redhead | 5.4 | 10.7 | / 72.9 |
| Canvasback | .3 | .2 | - 48.1 |
| Goldeneye | .2 | .2 | / 7.8 |
| Ringneck | .1 | Tr. | - 76.0 |
| Ruddy | Tr. | .1 | / 146.5 |
| Bufflehead | Tr. | Tr. | - |
| <u>Sub-Total</u> | 15.3 | 19.5 | / 11.8 |
| <u>Misc. Ducks</u> | | | |
| Merganser | .7 | .9 | / 14.0 |
| Tree Ducks | Tr. | .2 | / 184.8 |
| <u>Sub-Total</u> | .7 | 1.1 | / 24.6 |
| <u>Geese</u> | | | |
| Snow Goose | 2.9 | 2.0 | - 38.2 |
| Canada Goose | 2.3 | 2.5 | - 2.4 |
| Blue Goose | .5 | .2 | - 56.6 |
| White-fronted Goose | .3 | .3 | - 17.9 |
| <u>Sub-Total</u> | 6.0 | 5.0 | - 25.1 |
| <u>Swans</u> | | | |
| Trumper | Tr. | Tr. | / 51.0 |
| Whistling | Tr. | Tr. | - |
| <u>Sub-Total</u> | Tr. | Tr. | / 51.0 |
| Coot | 8.7 | 8.4 | - 15.5 |
| <u>GRAND TOTAL</u> | 100.0 | 99.9 | - 13.0 |

Trend in Duck, Goose and Coot Populations - Central Flyway

1949 through 1959 (Comparable Coverage)



SOUTHERN SASKATCHEWAN

Weather and Water Conditions

The best way to describe the habitat condition in southern Saskatchewan this spring is to say that it is a repeat of the situation a year ago, only worse. A dry cold winter with very little snowfall continued the drouth in all areas, some areas worse than others. In no area did we find water conditions improved from May 1958. The prairie areas were in the poorest shape. Only B-East, which is near the parkland, had a reasonable show of water. It had a few bright spots near Humboldt and also south and east of Prince Albert; however, the overall B-East pond index of 334,500 water areas is down from 489,600 a year ago. Considering the overall pond index, for all strata in the southern portion of the Province, it was down 53 percent from a year ago and down 71 percent from the nine year (1949 through 1957) average. The total pond index in May 1958 was 1,662,700 compared to 783,400 this year. The nine year average index is 2,650,700.

Spring rains in early and mid-May generally helped grain crop outlooks and pasture but the small amounts did nothing to improve water conditions for waterfowl. As of May 20, due to cool May, seeding of grains was about 60 percent done; a year ago it was 80 percent finished. Actually a warm April brought in early migrants, with an early break-up, and found mallards and pintails nesting by mid-April. However, a cold snap on April 25 brought temperatures down to 5° - 10° above zero in many southern parts of the Province and no doubt cancelled out much of this early egg-laying activity.

As far as farmers of the Province were concerned the drought was broken in June. However, most of the water was absorbed by the dry ground and little if any runoff was noted. A few areas had sheet water present during the early weeks in July, but this was rapidly disappearing as only rain-shower activities prevailed during July. Some water collected in a few potholes from the June rains and helped to slow down the complete drying up of some of the larger sloughs and ponds. Many larger areas, however, that had water in them last fall, were completely dry as of this July.

The pond index for July for the area was down 44 percent from 1958; 1959 index--428,423, 1958 index--764,942. The six-year average (1952-1957) stood at 2,207,400. The 1959 pond index was 81 percent below that six-year average. This has been a steady

SOUTHERN SASKATCHEWAN - Continued

decline from a high of 3,793,700 in 1955. All strata showed major declines, the strata in the southeast and southwest were in the poorest conditions. As we progressed north conditions improved, particularly in stratum B-East, however, they were still far worse than they had been last year or the previous seven years.

Habitat conditions for raising young ducks were poor. Little or no marsh vegetation was present early in the season for cover and wide mud flats at water edges added to the hazards. Predation was reported by ground observers as heavy on nests in all areas.

Breeding Population Indices

The overall breeding population index this year stood at 3,171,800 compared to 5,193,900 a year ago, a loss of over two million birds. Percentage-wise it was down 39 percent from last year. Both the dabblers and divers were down 40 percent and 27 percent, respectively. In addition, both dabblers and divers, as well as all ducks were down significantly from the nine-year average.

Mallards for the first time in the last eight years showed a significant drop, 41 percent from last year. Of the dabblers only gadwall showed an increase. Of divers, scaup, canvasback, and redheads showed a positive decline of more than 20 percent. Ringneck and ruddy duck were up more than 20 percent. Pintails continued a decline from a high of 1,969,500 in 1956 to 383,800 this year. This is a 51 percent decrease from 1958 and a 68 percent decline from the nine-year average. Coots were showing a 12 percent increase this year which can be considered a no change situation.

A comparison of this year's population index was made with the four-year average of 1949 through 1952. It is of interest to note that we are now at a level, in waterfowl populations in southern Saskatchewan, which compares to that period about 1949 through 1952. With the exception of mallards and one or two other species, the bulk of the ducks are about the same or below those years' levels.

For other comparative data note Tables 1 through 4.

Production Indices

Broods were at a very low figure. They were down 58 percent from 1958 and down 71 percent from the six-year average (1952-1957). The only previous year that had a low compared to this was 1954. The number of ducklings per Class III brood stood at 3.74. This was the lowest rate ever recorded in the past ten years of operation in this area. It compared to 4.3 ducklings per brood in July of 1958. Combining Class II and III broods it was noted that the rate stood 4.0 for the average brood size. This compared to 4.16 for last year and 5.9 for the six-year average. Broods per square mile were 0.93 compared to 2.2 in 1958. From the record, 1958 was below 1957 to the extent of 59 percent in numbers of broods.

Indications were that late broods would be more numerous in the northwest and northeast strata. In the other strata later broods were not appearing and there the prospects looked dim for these classes. Of the total broods seen the classes were broken down as follows: Class I - 30.5 percent, Class II - 38.7 percent, Class III - 30.8 percent indicating a fairly even distribution of broods at this time.

Coot broods were down 75 percent from 1958 and down 92 percent from the six-year average. There was certainly a lack of coots as well as coot broods. A number of larger marshes held a good supply of coots but nesting intentions of these individuals was problematical. No indications from these concentrations showed any nesting efforts. Unless production of coots is tremendous in the well-watered areas to the far north and east a major decline in the coot flight is indicated.

The late nesting index (numbers of lone drakes, hens, and pairs still remaining on the transects at this period) was down 54 percent from last year. It was felt that this year's low late nesting index would not, under the declining water levels, offer any better showing in late broods than last year, which was poor in spite of a large late nesting index. This being the case, we can look for little or no encouragement in this nesting effort to bring up the production in late nesting species or in late re-nesting attempts. For further details, note Tables 5 through 7.

Table 1. Species Indices (Aerial) - May 1959 Waterfowl Population - Southern Saskatchewan

| Species | STRATA | | | | | Province Totals |
|-------------------|---------|---------|-----------|---------|---------|-----------------|
| | A-East | A-West | B-East | B-West | C | |
| Pintail | 31,900 | 112,700 | 157,800 | 36,900 | 44,500 | 383,800 |
| Mallard | 320,600 | 416,700 | 766,800 | 250,100 | 101,400 | 1,855,600 |
| Baldpate | 37,900 | 33,300 | 73,300 | 28,800 | 9,500 | 182,800 |
| Shoveler | 33,100 | 20,400 | 77,000 | 26,500 | 10,400 | 167,400 |
| Gadwall | 10,100 | 23,700 | 26,100 | 9,000 | 3,000 | 71,900 |
| B. W. Teal | 93,500 | 21,700 | 23,600 | 12,800 | 1,500 | 153,100 |
| G. W. Teal | 3,500 | 2,000 | 9,900 | 2,800 | - | 18,200 |
| <hr/> | | | | | | |
| Sub-Total | | | | | | |
| Surface Ducks | 530,600 | 630,500 | 1,134,500 | 366,900 | 170,300 | 2,832,800 |
| <hr/> | | | | | | |
| ♂ Scaup | 28,400 | 26,500 | 39,800 | 58,600 | 8,000 | 161,300 |
| Canvasback | 16,000 | 6,800 | 22,400 | 15,100 | 3,900 | 64,200 |
| Redhead | 13,600 | 4,100 | 12,400 | 9,000 | 2,000 | 41,100 |
| Ringneck | 2,400 | 2,000 | 16,100 | 9,500 | 900 | 30,900 |
| Ruddy Duck | Trace | 7,500 | 8,700 | 500 | 900 | 17,600 |
| Goldeneye | 600 | - | 2,500 | 500 | - | 3,600 |
| Bufflehead | Trace | 700 | 5,000 | 6,600 | - | 12,300 |
| Scoter | - | - | 1,200 | 6,100 | - | 7,300 |
| Merganser | - | 700 | - | - | - | 700 |
| <hr/> | | | | | | |
| Sub-Total Divers | 61,000 | 48,300 | 108,100 | 105,900 | 15,700 | 339,000 |
| <hr/> | | | | | | |
| GRAND TOTAL DUCKS | 591,600 | 678,800 | 1,242,600 | 472,800 | 186,000 | 3,171,800 |
| <hr/> | | | | | | |
| Coots | 2,200 | 10,300 | 54,600 | 12,200 | 3,200 | 82,500 |
| Ponds | 157,700 | 160,200 | 334,500 | 57,400 | 73,600 | 783,400 |

Table 2. Comparative Indices - May Waterfowl Population - Southern Saskatchewan

Table 3. Comparative Indices by Species of the May 1959 Waterfowl Population -
Southern Saskatchewan

| Species | 9 Yr. Aver. (1949 thru 1957) to 1959 | 4 Yr. Aver. (1949 thru 1952) to 1959 | 1958 to 1959 | 9 Yr. Aver. (1949 thru 1957) to 1959 | 4 Yr. Aver. (1949 thru 1952) to 1959 | 1958 to 1959 |
|---------------|--|--|--------------|--|--|-----------------|
| Pintail | - 818,800 | - 403,100 | - 405,500 | - 68.1 | - 51.2 | - 51.4 |
| Mallard | - 230,800 | - 863,500 | - 1,309,500 | - 14.2 | - 87.0 | - 41.4 |
| Baldpate | - 21,500 | - 300 | - 92,900 | - 10.5 | - 0.2 | - 33.7 |
| Shoveler | - 92,800 | - 15,100 | - 45,800 | - 35.7 | - 8.3 | - 21.5 |
| Gadwall | - 19,900 | - 7,900 | - 18,000 | - 21.7 | - 9.9 | - 33.4 |
| B. W. Teal | - 84,900 | - 18,100 | - 53,900 | - 35.7 | - 10.6 | - 26.0 |
| G. W. Teal | - 12,700 | - 4,600 | - 5,900 | - 41.1 | - 20.2 | - 24.5 |
| Sub-Total | | | | | | |
| Surface Ducks | - 819,800 | - 415,000 | - 1,895,500 | - 22.4 | - 17.2 | - 40.1 |
| Scaup | - 106,100 | - 36,300 | - 52,700 | - 39.7 | - 29.0 | - 24.6 |
| Canvasback | - 91,200 | - 15,600 | - 93,400 | - 58.7 | - 19.6 | - 59.3 |
| Redhead | - 27,300 | - 18,300 | - 17,900 | - 39.9 | - 80.3 | - 30.3 |
| Ringneck | - 21,800 | - 19,500 | - 25,200 | - 239.6 | - 171.1 | - 442.1 |
| Ruddy Duck | - 10,300 | - 5,200 | - 5,000 | - 36.9 | - 22.8 | - 39.7 |
| Goldeneye | - 5,200 | - 7,800 | - 1,600 | - 59.1 | - 68.4 | - 30.8 |
| Bufflehead | - 2,300 | - 900 | - 6,500 | - 23.0 | - 7.9 | - 112.1 |
| Scoter | - 29,600 | - 38,300 | - 2,100 | - 80.2 | - 84.0 | - 40.4 |
| Sub-Total | | | | | | |
| Divers | - 245,600 | - 8,100 | - 126,800 | - 42.1 | - 2.5 | - 27.3 |
| GRAND TOTAL | | | | | | |
| DUCKS | -1,065,400 | - 423,100 | - 2,022,300 | - 25.2 | - 15.4 | - 38.9 |
| Coots | - 65,000 | - 16,400 | - 8,600 | - 44.1 | - 24.8 | - 11.6 |
| Ponds | -1,867,300 | -1,497,600 | - 879,300 | - 70.5 | - 65.7 | - 52.9 |

Table 4. May Waterfowl Population Summary - Southern Saskatchewan

| Species | STRATA | | | | | Province Totals |
|----------------------------|---------|---------|-----------|---------|---------|-----------------|
| | A-East | A-West | B-East | B-West | C | |
| Area in Sq. Miles | 14,600 | 37,630 | 33,720 | 16,800 | 11,290 | 114,040 |
| Sample in Sq. Miles | 317.0 | 622.0 | 173.0 | 165.0 | 127.0 | 1404.0 |
| Ducks Actually Seen | | | | | | |
| Lone Drakes | 1,475 | 1,199 | 927 | 520 | 199 | 4,320 |
| Pairs | 1,604 | 716 | 459 | 320 | 177 | 3,276 |
| Flocks | 593 | 122 | 214 | 103 | 22 | 1,054 |
| Unidentified | 4,491 | 4,954 | 2,185 | 1,943 | 963 | 14,536 |
| Percent Lone Males | 63.97 | 71.75 | 79.17 | 75.0 | 60.4 | 73.2 |
| Identified Ducks Seen | 5,276 | 2,753 | 2,059 | 1,263 | 575 | 11,926 |
| Ducks per Sq. Mile | 40.5 | 18.0 | 36.9 | 28.1 | 16.5 | 27.8 |
| Stratum Population Indices | 591,600 | 678,800 | 1,242,600 | 472,800 | 186,000 | 3,171,800 |
| Coots per Sq. Mile | 0.15 | 0.27 | 1.62 | 0.73 | 0.28 | 0.72 |
| Coots Stratum Total | 2,200 | 10,300 | 54,600 | 12,200 | 3,200 | 82,500 |
| Ponds per Sq. Mile | 10.8 | 4.3 | 9.9 | 3.4 | 6.5 | 6.9 |
| Ponds Stratum Total | 157,700 | 160,200 | 334,500 | 57,400 | 73,600 | 783,400 |
| Expansion Factor | 46.06 | 60.5 | 194.91 | 101.82 | 88.9 | 81.23 |
| Linear Miles in Sample | 1,268 | 2,488 | 692 | 660 | 508 | 5,616 |

Table 5. Summary of Air Data - Southern Saskatchewan - July 1959

| | | | STRATA | | | |
|----------------------|---------|---------|---------|--------|--------|----------|
| | A-East | A-West | B-East | B-West | C | Province |
| Size in sq. miles | 14,600 | 37,630 | 33,720 | 16,800 | 11,290 | 114,040 |
| Sample sq. miles | 158.5 | 311 | 86.5 | 82.5 | 63.5 | 702 |
| Broods act. seen | 156 | 104 | 121 | 144 | 13 | 538 |
| Broods/sq. mile | 0.98 | 0.33 | 1.40 | 1.75 | 0.21 | 0.93 |
| Brood Index | 14,369 | 12,584 | 47,169 | 29,324 | 2,311 | 105,757 |
| PLB act. seen | 531 | 446 | 78 | 150 | 103 | 1,308 |
| PLB/sq. mile | 3.35 | 1.43 | 0.90 | 1.82 | 1.62 | 1.60 |
| Late nesting index | 48,900 | 54,000 | 30,400 | 30,500 | 18,300 | 182,100 |
| Ponds act. seen | 1,552 | 996 | 262 | 181 | 146 | 3,137 |
| Ponds/sq. mile | 9.79 | 3.20 | 3.20 | 2.19 | 2.30 | 3.76 |
| Pond Index | 142,955 | 120,516 | 102,135 | 36,858 | 25,959 | 428,423 |
| Coot broods seen | 1 | 1 | 4 | 17 | 1 | 24 |
| Coot broods/sq. mile | 0.01 | Trace | 0.05 | 0.21 | 0.02 | 0.05 |
| Coot Brood Index | 92 | 121 | 1,559 | 3,462 | 178 | 5,412 |

Table 6. Brood and Late Nesting Indices (Aerial) - Southern Saskatchewan - July Surveys 1959

| Species | A-West | A-East | B-East | B-West | C | Province | |
|--------------------|------------------|---------|---------|--------|--------|----------|--------|
| Broods | | | | | | | |
| Not Speciated | 12,584 | 14,369 | 47,169 | 29,324 | 2,311 | 105,757 | |
| Pintail | 2,400 | 1,000 | - | - | - | 3,400 | |
| Mallard | 22,400 | 17,600 | 16,400 | 12,000 | 11,600 | 80,000 | |
| Baldpate | 8,700 | 1,400 | - | 2,200 | 2,900 | 15,200 | |
| Shoveler | 500 | 1,100 | - | 1,100 | - | 2,700 | |
| Gadwall | 2,900 | 200 | 2,300 | - | - | 5,400 | |
| B. W. Teal | 6,800 | 22,000 | 2,300 | 3,200 | 1,900 | 36,200 | |
| C. W. Teal | 500 | 500 | - | - | - | 1,000 | |
| Sub-Total Paddlers | 44,200 | 43,800 | 21,000 | 18,500 | 16,400 | 143,900 | |
| Late Nesting Index | Scaup | 4,900 | 3,700 | - | 2,200 | - | 10,800 |
| | Canvasback | 2,400 | - | - | 1,100 | - | 3,500 |
| | Redhead | 500 | 500 | - | - | - | 1,00 |
| | Ringneck | 1,000 | 700 | - | - | - | 1,700 |
| | Ruddy | 1,000 | - | 9,400 | 5,400 | 1,900 | 17,700 |
| | Goldeneye | - | - | - | 1,100 | - | 1,100 |
| | Bufflehead | - | 200 | - | - | - | 200 |
| | Scoter | - | - | - | 2,200 | - | 2,200 |
| | Sub-Total Divers | 9,800 | 5,100 | 9,400 | 12,000 | 1,900 | 38,200 |
| GRAND TOTAL DUCKS | | | | | | | |
| Broods | 54,000 | 48,900 | 30,400 | 30,500 | 18,300 | 182,100 | |
| Pond Index | 120,516 | 142,955 | 102,135 | 36,858 | 25,959 | 428,423 | |

Table 7. Comparative Brood and Late-Nesting Indices (Aerial) - Southern Saskatchewan -
July Surveys 1952-59

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| Species | 6-Yr. Avg. | | 1956 | 1957 | 1958 | 1959 |
|---------|---|-----------|-----------|-----------|-----------|---------|
| | 1952-1957 | 1955 | | | | |
| Broods | Not Speciated | 358,100 | 317,400 | 422,200 | 615,839 | 253,135 |
| | Pintail | 26,800 | 79,400 | 18,200 | 5,385 | 31,900 |
| | Mallard | 89,400 | 180,400 | 79,700 | 41,507 | 182,600 |
| | Baldpate | 15,600 | 21,300 | 12,000 | 4,012 | 23,200 |
| | Shoveler | 11,200 | 22,800 | 12,000 | 2,243 | 10,900 |
| | Gadwall | 14,900 | 28,500 | 16,400 | 3,460 | 16,700 |
| | B. W. Teal | 36,900 | 77,600 | 54,300 | 11,767 | 50,200 |
| | G. W. Teal | 3,800 | 8,000 | 2,200 | 1,381 | 4,100 |
| | Sub-Total Paddlers | 198,600 | 418,000 | 194,800 | 69,755 | 319,600 |
| | Scaup | 24,400 | 4,300 | 26,200 | 27,504 | 35,400 |
| | Canvasback | 7,300 | 15,500 | 7,300 | 1,707 | 7,700 |
| | Redhead | 6,000 | 8,400 | 10,500 | 1,943 | 8,200 |
| | Ringneck | 1,900 | 3,700 | 100 | 204 | 2,800 |
| | Ruddy Duck | 14,600 | 20,000 | 21,300 | 7,449 | 13,900 |
| | Goldeneye | 500 | - | - | - | 1,100 |
| | Bufflehead | 200 | 900 | - | - | 200 |
| | Scoter | 1,500 | 44,100 | 900 | - | 900 |
| | Sub-Total Divers | 56,400 | 96,900 | 66,300 | 38,807 | 68,900 |
| | GRAND TOTAL DUCKS | 255,000 | 514,900 | 261,100 | 108,562 | 388,500 |
| | Coot Broods | 66,400 | 21,000 | 81,800 | 254,178 | 21,597 |
| | POND INDEX | 2,207,400 | 3,793,700 | 1,753,200 | 1,254,010 | 764,942 |
| | Number Ducklings Per Class III Brood | 5.9 | 6.0 | 5.6 | 6.0 | 4.3 |
| | | | | | | 3.74 |

SOUTHERN SASKATCHEWAN - Continued

Conclusions

It is estimated that the fall flight of ducks will decrease more than 50 percent from southern Saskatchewan as compared to 1958. The outlook for this year is the poorest since aerial surveys were first initiated in 1951. Habitat and nesting conditions are particularly critical for canvasbacks, redhead, and coot and it is estimated that the decreases among these species will considerably exceed the average for other species.

NORTH DAKOTA, SOUTH DAKOTA, AND MINNESOTA

Weather and Water Conditions

The western Minnesota, North and South Dakota aerial survey began on May 8 and completed on May 19.

Farming operations were well under way at this time. The entire area was void of any appreciable amount of snowfall during the winter and early spring months. The few spring rains did little to improve habitat conditions.

Drought conditions were severe. Lack of snowfall, spring rains, intense winds, shortage of top and subsoil moisture, set the stage for a critical shortage of waterfowl habitat.

Damage by wind erosion, especially to fields of light soil, was severe. Many planted small grainfields were covered by layers of wind-blown soil. This gave a blend of brown and green to the fields below. Some land managers were turning over planted fields for re-seeding, because of this wind erosion. Natural water areas in many instances are dry or holding water levels at a critical stage. Burning of marginal vegetation continues on the dry sloughs and potholes. Many of these areas, providing waterfowl habitat in the past, are now under cultivation. Low water levels were prominent in the entire area. Many water areas had shrunk in size. Emergent vegetation was isolated by bare mud flats which extended to the water's edge. This condition has eliminated much of the nesting habitat normally utilized by over-water nesters.

Water levels were low on many of the stock ponds and dugouts in the western strata. Lack of vegetation caused by intense grazing by livestock was observed in the immediate vicinity of these artificial water areas.

Within the Tri-State area the Pond Index figures by strata for each State are presented in Table 1.

During July the drying trend continued. By mid-July the pond index in North Dakota was 80 percent down from a corresponding period in 1958, it was 69 percent down in South Dakota, and it was 55 percent down in Minnesota. Water levels on some areas where broods were observed were extremely low. It is probable that mortality will occur on these areas before the young reach flying stage if the drying trend continues at the present rate.

NORTH DAKOTA, SOUTH DAKOTA, AND
MINNESOTA - Continued

Breeding Population Indices

In the Tri-State area as a unit there was a decrease of 56 percent in breeding population this spring which parallels the decline in water areas (- 60%). However, among the three States there were decreases of 64 percent and 68 percent in the States of North Dakota and South Dakota respectively, while there was an increase of 94 percent in the breeding population index in Minnesota. The increase in Minnesota occurred in spite of a decrease in water areas. The habitat in Minnesota is characterized by a larger number of deeper, more permanent lakes, which have probably attracted birds from the drought areas to the west where fewer water areas of this type are present.

The coot index increased greatly in the Tri-State area (+ 192%) with most of the increase occurring in Minnesota. This increase could be misleading as coot were observed concentrated in numbers on large water areas. The same thing was true with puddle ducks. This was at a time when nesting should have been well underway.

The breeding population data for the three States for 1958 and 1959 are presented in Table 2.

Production Indices

The drastic reduction in available water areas before and during the nesting period apparently influenced the numbers of broods produced. Brood Sizes were small. Late nesting activity was verified by the number of Class I broods observed in and outside the limits of the transects. Very few divers were observed throughout the area covered. Larger bodies of water held flocks of waterfowl that did not appear to be nesting.

Stock ponds and dugouts in the western strata that held pairs of waterfowl during the May survey and were still holding water in July, were barren of either adult or broods during the July survey. This leads to speculation as to what extent areas, especially "dugouts," contribute to waterfowl reproduction.

The production data collected in the three States are summarized in Tables 3, 4 and 5.

Table 1. May Water Index Figures by Strata for North Dakota,
South Dakota and Minnesota - 1958 and 1959

| State | Stratum | 1958 | 1959 | Percent Change |
|---------------------|------------------|----------------|----------------|----------------|
| North Dakota | | | | |
| | East | 30,910 | 15,552 | - 50 |
| | Central | 180,520 | 79,344 | - 56 |
| | <u>West</u> | <u>49,710</u> | <u>27,544</u> | - 45 |
| | <u>Sub-Total</u> | <u>261,140</u> | <u>122,440</u> | - 53 |
| South Dakota | | | | |
| | East | 60,809 | 37,005 | - 39 |
| | Central | 139,190 | 29,887 | - 79 |
| | <u>West</u> | <u>69,450</u> | <u>41,168</u> | - 41 |
| | <u>Sub-Total</u> | <u>269,539</u> | <u>108,060</u> | - 60 |
| Minnesota | | | | |
| | N. W. | 110,235 | 49,540 | - 55 |
| | <u>S. W.</u> | <u>204,262</u> | <u>60,249</u> | - 71 |
| | <u>Sub-Total</u> | <u>314,497</u> | <u>109,789</u> | - 65 |
| GRAND TOTAL | | | | |
| | | 845,176 | 340,289 | - 60 |

Table 2. Breeding Population Indices by Strata in North Dakota, South Dakota, and Minnesota in 1959 and Comparison with 1958

| | NORTH DAKOTA | | | '59 Total | '58 Total |
|---------------------------|--------------|---------|--------|-----------|-----------|
| | West | Central | East | | |
| Stratum Size (sq. mi.) | 23,474 | 33,861 | 13,330 | 70,665 | - |
| Sample Size (sq. mi.) | 75.0 | 297.0 | 36.0 | 408.0 | - |
| Expansion Factor | 313.0 | 114.0 | 370.3 | - | - |
| Population Index (sample) | 42 | 1,111 | 22 | - | - |
| Population Index (total) | 13,146 | 126,654 | 8,147 | 147,947 | 408,698 |
| Species Composition | | | | | |
| Pintail | - | 12,918 | - | 12,918 | 80,410 |
| Mallard | 11,398 | 45,089 | 6,110 | 62,597 | 153,250 |
| Baldpate | - | 6,079 | - | 6,079 | 11,611 |
| Shoveler | - | 10,006 | - | 10,006 | 21,350 |
| Gadwall | - | 4,180 | - | 4,180 | 27,500 |
| BW Teal | 1,748 | 29,384 | 2,037 | 33,169 | 79,503 |
| GW Teal | - | - | - | - | 909 |
| Scaup | - | 8,992 | - | 8,992 | 4,476 |
| Canvasback | - | 3,546 | - | 3,546 | 23,429 |
| Redhead | - | 2,280 | - | 2,280 | 5,805 |
| Ruddy | - | 4,180 | - | 4,180 | 455 |
| Total 1959 | 13,146 | 126,654 | 8,147 | 147,947 | - |
| Total 1958 | 28,844 | 349,716 | 30,138 | - | 408,698 |
| Percent change | -54 | -64 | -73 | - | -64 |
| Coot 1959 | 0 | 30,096 | 370 | 30,466 | - |
| Coot 1958 | 920 | 22,424 | 2,705 | - | 26,049 |
| Percentage change | -- | +34 | -86 | -- | +17 |

Table 2. Breeding Population Indices by Strata in North Dakota, South Dakota, and Minnesota in 1959 and Comparison with 1958 (Cont'd)

| | SOUTH DAKOTA | | | '59 Total | '58 Total |
|---------------------------|--------------|---------|---------|-----------|-----------|
| | West | Central | East | | |
| Stratum Size (sq. mi.) | 26,598 | 25,591 | 21,481 | 73,670 | - |
| Sample Size (sq. mi.) | 130.5 | 358.0 | 68.5 | 557.0 | - |
| Expansion Factor | 203.8 | 71.5 | 313.6 | - | - |
| Population Index (sample) | 205 | 928 | 142 | - | - |
| Population Index (total) | 41,779 | 66,352 | 44,530 | 152,661 | 484,500 |
| Species Composition | | | | | |
| Pintail | 1,838 | 3,981 | 1,692 | 7,511 | 127,600 |
| Mallard | 24,817 | 18,977 | 18,480 | 62,274 | 236,650 |
| Baldpate | - | 2,322 | - | 2,322 | - |
| Shoveler | 2,423 | 6,038 | 2,538 | 10,999 | 35,800 |
| Gadwall | - | - | - | - | 2,300 |
| BW Teal | 12,701 | 28,797 | 18,480 | 59,978 | 70,350 |
| GW Teal | - | - | - | - | - |
| Scaup | - | 4,180 | 3,340 | 7,520 | 3,550 |
| Canvasback | - | 2,057 | - | 2,057 | - |
| Redhead | - | - | - | - | 3,600 |
| Ruddy | - | - | - | - | 4,650 |
| Total 1959 | 41,779 | 66,352 | 44,530 | 152,661 | - |
| Total 1958 | 128,050 | 231,000 | 125,450 | - | 484,500 |
| Percent Change | -67 | -71 | -65 | - | -68 |
| Coot 1959 | 3,464 | 1,216 | 627 | 5,307 | - |
| Coot 1958 | 0 | 1,263 | 248 | - | 1,511 |
| Percent Change | ++ | -4 | +153 | | +251 |

Table 2. Breeding Population Indices by Strata in North Dakota, South Dakota, and Minnesota in 1959 and Comparison with 1958 (Cont'd)

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| | MINNESOTA | | | '59 Total | '58 Total |
|---------------------------|-----------|--------|--|-----------|-----------|
| | NW | SW | | | |
| Stratum Size (sq. mi.) | 12,386 | 24,910 | | 37,296 | |
| Sample Size (sq. mi.) | 27.0 | 105.0 | | 132.0 | |
| Expansion Factor | 458.7 | 237.2 | | | |
| Population Index (sample) | 78 | 328 | | | |
| Population Index (total) | 35,778 | 77,801 | | 113,579 | 58,449 |
| Species Composition | | | | | |
| Pintail | 1,216 | - | | 1,216 | 9,459 |
| Mallard | 14,812 | 26,919 | | 41,731 | 29,902 |
| Baldpate | - | 20,384 | | 20,384 | - |
| Shoveler | - | - | | - | 720 |
| Gadwall | 2,469 | 622 | | 3,091 | - |
| BW Teal | 17,281 | 16,727 | | 34,008 | 15,486 |
| GW Teal | - | - | | - | - |
| Scaup | - | 8,403 | | 8,403 | - |
| Canvasback | - | 4,746 | | 4,746 | - |
| Redhead | - | - | | - | - |
| Ruddy | - | - | | - | 2,882 |
| Total 1959 | 35,778 | 77,801 | | 113,579 | |
| Total 1958 | 13,761 | 44,688 | | - | 58,449 |
| Percent Change | +160 | +74 | | | +94 |
| Coot 1959 | 22,018 | 30,124 | | 52,142 | |
| Coot 1958 | 505 | 2,075 | | - | 2,580 |
| Percent Change | ++ | ++ | | | ++ |

Table 2. Breeding Population Indices by Strata in North Dakota, South Dakota, and Minnesota in 1959 and Comparison with 1958 (Cont'd)

| | TRI-STATE AREA | | |
|---------------------------|----------------|-----------|----------|
| | Total '59 | Total '58 | % Change |
| Stratum Size (sq. mi.) | 181,631 | - | - |
| Sample Size (sq. mi.) | 1097.0 | - | - |
| Expansion Factor | - | - | - |
| Population Index (sample) | | | |
| Population Index (total) | 414,187 | 951,647 | -56 |
| Species Composition | | | |
| Pintail | 21,645 | 217,469 | -90 |
| Mallard | 166,602 | 419,802 | -60 |
| Baldpate | 28,785 | 11,611 | +148 |
| Shoveler | 21,005 | 57,870 | -64 |
| Gadwall | 7,271 | 29,800 | -76 |
| BW Teal | 127,155 | 165,339 | -23 |
| GW Teal | - | 909 | -- |
| Scaup | 24,915 | 8,026 | +210 |
| Canvasback | 10,349 | 23,429 | -56 |
| Redhead | 2,280 | 9,405 | -76 |
| Ruddy | 4,180 | 7,987 | -48 |
| Total 1959 | 414,187 | | |
| Total 1958 | | 951,647 | |
| Percent Change | | | -56 |
| Coot 1959 | 87,915 | | |
| Coot 1958 | | 30,140 | |
| Percent Change | | | +192 |

Table 3. Comparison of 1957-1959 - Mid-July Aerial
North Dakota

| | 1957 | 1958 | 1959 | % Change From 1958 |
|---------------------------|---------|---------|---------|-----------------------|
| Broods actually seen | 140 | 136 | 47 | - 65.4 |
| Broods per square mile | 0.7 | 0.7 | .23 | |
| Brood Index | 39,250 | 32,937 | 12,392 | |
| Late Nesting Index | 46,845 | 24,897 | 6,840 | - 72.5 |
| Pond Index | 198,755 | 299,736 | 130,075 | - 56.7 |
| Coot Brood Index | 11,445 | 5,079 | 1,016 | - 80 |
| <u>Average Brood Size</u> | | | | |
| Class II | 5.1 | 5.7 | 5.3 | |
| Class III | 5.2 | 5.7 | 4.6 | |

Table 4. Comparison of 1957-59 - Mid-July Aerial
South Dakota

| | 1957 | 1958 | 1959 | % Change From 1958 |
|---------------------------|---------|---------|------|-----------------------|
| Broods actually seen | | | 30 | - |
| Broods per square mile | | | .11 | - |
| Brood Index | 38,027 | 7,110 | - | 81.3 |
| Late Nesting Index | 59,687 | 8,276 | - | 86.1 |
| Pond Index | 402,584 | 124,764 | - | 69 |
| Coot Brood Index | 3,000 | 286 | - | 90.5 |
| <u>Average Brood Size</u> | | | | |
| Class II | | | 4.6 | |
| Class III | | | 4.3 | |

Table 5. Comparison of 1957-1959 - Mid-July Aeria Survey
Minnesota

| | 1957 | 1958 | 1959 | % Change From 1958 |
|---------------------------|---------|---------|---------|-----------------------|
| Broods actually seen | 22 | 21 | 10 | - 52.4 |
| Broods per square mile | 0.35 | 0.33 | .15 | - |
| Brood Index | 12,566 | 12,305 | 5,608 | - |
| Late Nesting Index | 14,030 | 9,067 | 1,122 | - 87.6 |
| Pond Index | 339,892 | 314,497 | 141,322 | - 55.1 |
| Coot Brood Index | 4,148 | 4,847 | 561 | - 90.3 |
| <u>Average Size Brood</u> | | | | |
| Class II | 5.1 | 5.7 | 4.7 | |
| Class III | 5.2 | 5.7 | - | |

Conclusions

There will be a drastic decline in the fall flight of ducks from North and South Dakota, and a moderate decline from Minnesota.

MONTANA

Weather and Water Conditions

Water conditions during the May survey of the glaciated physiographic subdivisions were improved over last year in all areas except Sheridan County (Table 1). There was an increase in the number of reservoirs in all areas except the Great Falls Piedmont, this was probably due to an increase in runoff from the melting of the heavier than average snow cover this year. The big increases were in the number of potholes in the Central Hi-Line and Great Falls Piedmont.

Most of the stock reservoirs were filled and on many the water was going over the spillway, others that had been dry were filled to capacity, particularly in the Eastern and Central Hi-Line. In the Great Falls Piedmont, the reservoirs were nearly all filled last year and remained good this year. The big increase of water areas in the Central Hi-Line was in the pothole type of which most were temporary. At this time it is questionable of how much value these were to waterfowl this year. This may be determined during the production survey.

The water conditions in the unglaciated prairie was improved this year due to the heavier snow cover and runoff in the reservoir type. The number of reservoirs containing water increased in the McCone County trend area. This was generally the case throughout eastern Montana. This increase in reservoir water should be of the more permanent type and will be of great value, at least to the puddle ducks.

Breeding Population Indices

The 1959 May survey indicated an 18% increase in total ducks over last year (Table 2). With the exception of Sheridan County, all of the physiographic areas showed an increase in duck numbers over the 10-year average.

There was also an increase in numbers of ducks in the southern unglaciated prairies. The Carter County trend area went from 1.6 ducks per square mile in 1957 to 3.2 in 1958 and up to 12.3 ducks per square miles this year. The numbers of waterfowl in the McCone County trend area remained about the same as 1957, (about 1.3 ducks per square mile). No survey of this area was made last year.

MONTANA - Continued

The general increase in ducks, noted in the May survey, is probably due to improved water conditions. Since the May survey there has been a further increase of breeding waterfowl show up in Montana. Some of these birds are nesting late. What the percent of increase in breeding birds over the May survey is undetermined as yet.

This later influx of waterfowl may be some of the displaced waterfowl from the reported drought stricken prairie provinces of Canada.

Canada Goose Surveys

The Canada goose population and production trend in the Hi-Line and Flathead Units remain unchanged, with possibly a slight drop in production.

The Canada goose population and production trend in the Great Falls Piedmont Areas are down from the previous year.

A survey of the Canada goose population and production was initiated in the Helena Area. The data collected are presented in Tables 4 and 5.

Table 1. Comparative Water Conditions on Aerial Transects - 1957, 1958 and 1959 - Montana

| Physiographic Area | Reservoirs | | | Potholes | | | Other | | | Total | | | Percent change from 1958 |
|----------------------|-------------------------|------|------|-------------------------|------|------|-------------------------|------|------|-------------------------|------|------|--------------------------|
| | Per Square Mile 1957 | 1958 | 1959 | |
| Sheridan County | .13 | .24 | .43 | 2.32 | 4.19 | 2.64 | .56 | .48 | .43 | 3.01 | 4.91 | 3.50 | -29 |
| Eastern Hi-Line | .57 | .40 | .64 | .08 | .37 | .34 | .94 | .84 | .88 | 1.60 | 1.60 | 1.81 | +13 |
| Central Hi-Line | .86 | .90 | 1.10 | .19 | .44 | 2.21 | .96 | .80 | .73 | 2.01 | 2.14 | 4.04 | +89 |
| Great Falls Piedmont | 1.13 | 1.22 | 1.22 | .44 | .76 | 1.43 | 1.07 | .77 | 1.04 | 2.63 | 2.75 | 3.69 | +34 |

Table 2. Waterfowl Populations as Determined from Aerial Transects - 1958, 1959

| Physiographic Area | Size of Area (Square Miles) | Approximate Square Miles Sampled | | Ducks Per Square Mile 10 Yr. Av. | | Population Estimate | | Percent change from 1958 | |
|----------------------|-----------------------------|----------------------------------|------|----------------------------------|------|---------------------|---------|--------------------------|-----|
| | | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | | |
| Sheridan County | 1,440 | 38 | 38 | 28.7 | 33.3 | 16.3 | 47,952 | 23,472 | -51 |
| Eastern Hi-Line | 7,926 | 172 | 172 | 4.9 | 4.4 | 5.0 | 34,874 | 39,630 | +14 |
| Central Hi-Line | 9,468 | 94 | 94 | 10.3 | 10.5 | 12.9 | 99,414 | 122,137 | +23 |
| Great Falls Piedmont | 7,020 | 143 | 143 | 8.4 | 7.4 | 13.1 | 51,948 | 91,962 | +77 |
| Total | | | | | | | 234,188 | 277,201 | +18 |

Table 3. Waterfowl Species Composition of Breeding Ducks -
Flathead Valley Trend Area

| Species | Number | | | | | Percent change 1958 to 1959 |
|-----------------|--------|------|------|------|------|--------------------------------|
| | 1955 | 1956 | 1957 | 1958 | 1959 | |
| Mallard | 36 | 109 | 44 | 50 | 17 | -66 |
| Pintail | 3 | 8 | 2 | 5 | 2 | -- |
| Baldpate | 18 | 7 | 18 | 9 | 8 | -- |
| Shoveler | 0 | 9 | 6 | 4 | 14 | -- |
| Gadwall | 1 | 32 | 2 | 2 | 9 | -- |
| Scaup | 0 | 10 | 5 | 9 | 1 | -- |
| Ruddy Duck | 6 | 42 | 22 | 32 | 32 | N.C. |
| G.W.T. | 0 | 4 | 12 | 4 | 6 | -- |
| B.W.T. | 12 | 52 | 55 | 73 | 77 | +5 |
| Redhead | 28 | 169 | 146 | 149 | 111 | -26 |
| Golden Eye | 0 | 0 | 4 | 0 | 0 | -- |
| Cinnamon Teal | 0 | 7 | 1 | 5 | 7 | -- |
| Total Ducks | 104 | 449 | 317 | 342 | 284 | -17 |
| Coot | 52 | 136 | 117 | 99 | 110 | +11 |

Table 4. Canada Goose Population Trend During Nesting Season - 1958 - 1959

| Trend Unit | 1958 | | | | 1959 | | | | Total |
|-------------------------|-------|---------|--------|-------|-------|---------|--------|--|-------|
| | Pairs | Singles | Groups | Total | Pairs | Singles | Groups | | |
| Hi-Line | 374 | 252 | 89 | 1089 | 548 | 63 | 120 | | 1279 |
| Great Falls Piedmont | 38 | 20 | 18 | 114 | 35 | 16 | 0 | | 86 |
| Helena | | | | | 17 | 97 | 97 | | 308 |

Table 5. Canada Goose Production Trend 1958 - 1959

| Trend Unit | 1958 | | | | 1959 | | | | Total |
|-------------------------|------|-------|-------|-------|------|-------|-------|--|-------|
| | NB* | Adult | Young | Total | NB* | Adult | Young | | |
| Hi-Line | 91 | 498 | 1233 | 1822 | 14 | 303 | 679 | | 1466 |
| Great Falls Piedmont | 100 | 65 | 106 | 271 | 56 | 46 | 97 | | 199 |
| Helena | | | | | 96 | 112 | 285 | | 493 |

*Non or Unsuccessful Breeders

WYOMING

Weather and Water Conditions

Phenologically, the season of 1959 has been similar to that of 1958. Various areas within the State that showed a drying trend last year have remained that way and those areas having an ample supply of water in 1958 are in relatively good condition again this season.

During the month of April, below normal temperatures and precipitation were recorded for much of Wyoming. Low temperatures continued into May with a low of 10° above zero being recorded on May 5 at Big Piney. Precipitation during May ranged from slightly above normal in some areas to slightly below in others. June and July have been hot and dry generally and some brooding habitat at the lower elevations is being lost due to this drying trend.

Breeding Population Indices

Table 1 presents a summary of the duck breeding ground survey for 1959. The estimated breeding pair population for 1959 shows an increase of 16.3 percent over 1958 and an increase of 24.3 percent from the 1955-1958 average.

The total number of ducks counted as computed by combining the number of breeding pairs with birds that were found in groups. It will be seen that the total number of birds counted in 1959 is 218,483 or 27.0 percent above the estimate for 1958. This figure also represents a 39.1 percent increase from the previous 4-year average.

Table 2 indicates the long-term breeding ground trend for Wyoming geese. During 1958 little change was noted from the previous year, but the 1959 survey reveals a significant increase of 36.0 percent from the 1958 statewide total. The figure recorded for 1959 is still 16.0 percent below the 7-year average.

Conclusions

All of the available data indicates that the fall flight of ducks from Wyoming will be the best that has occurred from this State in recent years. The increase in the number of geese on the breeding areas indicates that the fall flight of this species from Wyoming will be somewhat greater than the one of 1958, but still below the long-term average.

Table 1. Summary of Duck Breeding Ground Survey - Wyoming 1958 - 1959

| Species | Pairs | | Estimated Population | | | Total Birds | | % Change From 1958 | % Change From 1955-58 Avg. |
|---------------|--------|--------|----------------------|----------------------------|---------|-------------|---------|--------------------|----------------------------|
| | 1958 | 1959 | % Change From 1958 | % Change From 1955-58 Avg. | 1958 | 1959 | | | |
| Mallard | 32,946 | 42,887 | + 30.2 | + 33.6 | 77,081 | 109,432 | + 42.0 | + 43.7 | |
| Pintail | 11,020 | 9,506 | - 15.9 | + 24.1 | 31,335 | 24,791 | - 26.4 | + 30.0 | |
| Teal | 7,347 | 8,102 | + 10.3 | + 21.8 | 15,117 | 19,121 | + 26.5 | + 48.0 | |
| Shoveler | 3,298 | 4,051 | + 22.8 | + 12.7 | 7,395 | 8,426 | + 13.9 | + 12.4 | |
| Gadwall | 3,077 | 5,887 | + 91.3 | + 127.4 | 6,157 | 12,422 | + 101.8 | + 121.8 | |
| Baldpate | 3,781 | 3,457 | - 9.4 | + 1.2 | 7,894 | 7,238 | - 9.1 | + 17.4 | |
| Redhead | 268 | 216 | - 24.1 | - 135.6 | 533 | 2,971 | + 457.4 | + 208.8 | |
| Ruddy | 107 | - | - 100.0 | - 100.0 | 860 | - | - 100.0 | - 100.0 | |
| Scaup | 214 | 702 | + 228.0 | + 112.7 | 430 | 2,484 | + 477.7 | + 282.7 | |
| Canvasback | - | 108 | + 108.0 | + 108.0 | - | 216 | + 216.0 | + 216.0 | |
| Goldeneye | - | 108 | + 108.0 | - 13.0 | - | 216 | + 216.0 | - 7.9 | |
| Coot | 1,569 | 5,833 | + 271.8 | + 245.6 | 3,405 | 13,340 | + 291.8 | + 212.6 | |
| Am. Merganser | 1,890 | 1,728 | - 9.4 | + 45.1 | 4,919 | 3,618 | - 36.0 | - 33.0 | |
| Unidentified | 1,514 | 2,917 | + 92.7 | + 5.8 | 16,853 | 31,166 | + 84.9 | + 51.5 | |
| Total | 67,031 | 77,941 | + 16.3 | + 24.3 | 171,979 | 218,483 | + 27.0 | + 39.1 | |

Table 2. Summary of Canada Geese Breeding Ground Survey - Wyoming 1952 - 1959

| Drainage | Total Number of Geese | | | | | | | | Average 1952 to 1958 | Percent Change From 1958 | Percent Change From Average |
|--------------------|-----------------------|--------------|--------------|--------------|------------|------------|--------------|-------------------|----------------------------|--------------------------------|-----------------------------------|
| | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | | | |
| Snake River | 334 | 506 | 267 | 437 | 347 | 350 | 208 | 350 ^{1/} | 350 | + 68 | - |
| Bear River | 361 | 369 | 183 | 270 | 264 | 299 | 331 | 387 | 299 | + 17 | + 29 |
| Green River | 360 | 336 | 204 | 119 | 160 | 162 | 161 | 235 | 215 | + 46 | + 9 |
| North Platte River | - | 509 | 296 | 219 | 147 | 81 | 194 | 232 | 241 | + 20 | - 4 |
| Wind River | - | 13 | 103 | 97 | 88 | 90 | 90 | 132 | 80 | + 47 | + 65 |
| Totals | 1,733 | 1,053 | 1,142 | 1,006 | 982 | 984 | 1,336 | 1,150 | + 36 | - 16 | |

Combined Green
and North Platte
River Totals

- 845 500 338 307 243 355 467 431 + 30 - 8

^{1/} Unable to obtain count on Snake River in 1959. Average figure for the previous seven-year period is used and probably closely approximates the actual population figure for 1959.

COLORADO

Weather and Water Conditions

Weather and water conditions in Colorado during the spring and early summer were considered to be good for waterfowl nesting and production. In general, water levels in eastern Colorado were above average while in the rest of the State conditions were much drier than last year and below average. This was due to above normal precipitation in the eastern slope and a "dry" winter in North Park and the west slope. The snow pack in the high-country appears to be below normal indicating short water supply for mid-summer.

The writers believe, however, that the overall weather and water conditions in Colorado were and are favorable for waterfowl production and brood rearing this year.

Breeding Population Indices

Examination of the duck breeding-pair estimates by area reveal the 1959 counts are down 3.8 percent from 1958, but 2.6 percent above the six-year average (Table 1).

Table 1. Summary of Colorado Duck Breeding Ground Conditions - 1959 with 1958 and the 6-year Average for Comparison

| Area | Total Estimated Breeding Pairs | | |
|------------------------|--------------------------------|--------|--------|
| | 6-year Average | 1958 | 1959 |
| San Luis Valley | 6,966 | 8,720 | 7,433 |
| North Park | 3,708 | 3,534 | 4,767 |
| South Platte Valley | 1,648 | 1,782 | 1,386 |
| Cache la Poudre Valley | 1,507 | 1,419 | 819 |
| Yampa Valley | 2,658 | 2,077 | 2,586 |
| Brown's Park | 125 | 199 | 62 |
| | | | |
| Total | 16,612 | 17,731 | 17,053 |

Comparison of individual breeding ground estimated between 1959 and 1958, show that North Park and Yampa Valley are above last year but that San Luis Valley and North Park are the

COLORADO - Continued

only areas above the 6-year average. This is believed to be caused by the below average water conditions in the west slope areas. The average or above water levels in the Platte and Poudre River areas are believed to have spread the paired water-fowl into other wet areas not included in the sample. There were ducks observed in areas where no water has been found for several years and all reservoirs in eastern Colorado are filled to near capacity even at this late date.

Species composition of the breeding duck population was similar to past years (Table 3). Mallards made up the bulk of the breeding birds (57.5%). The teal and redheads showed a marked increase while pintails indicate the largest decrease, however, there is little change from the 6-year average excepting again the teal and pintail. Any changes may in part be due to the late spring and varying water conditions around the State.

Table 3. Species Composition of the Colorado Breeding Population 1959, 1958 and 6-year Average

| Species | Number of Ducks | | | Species Composition | | |
|--------------------|-----------------|--------|-----------------|---------------------|-------|-------|
| | 6-Year | 1958 | 1959 | Percent | 1958 | 1959 |
| Mallard | 10,290 | 10,030 | 9,812 | 61.7 | 56.6 | 57.5 |
| Blue-winged teal | 880 | 651 | 927 | 5.3 | 3.7 | 5.4 |
| Pintail | 1,173 | 2,800 | 879 | 7.0 | 15.7 | 5.2 |
| Gadwall | 1,361 | 1,270 | 1,526 | 8.2 | 7.2 | 8.9 |
| Baldpate | 298 | 140 | 231 | 1.8 | .8 | 1.4 |
| Shoveler | 563 | 1,181 | 672 | 3.4 | 6.5 | 3.9 |
| Cinnamon teal | 649 | 418 | 1,101 | 3.9 | 2.4 | 6.5 |
| Green-winged teal | 390 | 260 | 364 | 2.3 | 1.5 | 2.1 |
| Redhead | 581 | 544 | 933 | 3.5 | 3.1 | 5.5 |
| Scaup | 294 | 294 | 245 | 1.8 | 1.7 | 1.4 |
| Ruddy duck | 45 | 87 | 81 | .2 | .5 | .5 |
| Bufflehead | 2 | - | - | .1 | - | - |
| Canvasback | 22 | - | 13 ⁴ | .1 | - | .8 |
| American merganser | 125 | 56 | 151 | .7 | .3 | .9 |
| | | | | | | |
| Total | 16,673 | 17,731 | 17,052 | 100.0 | 100.0 | 100.0 |

COLORADO - Continued

Production Indices

Goose breeding conditions show an increase in 1959 over 1958 and a satisfactory increase over the three-year average (Table 2). The upward trend is encouraging as it reflects the success of the hunting restriction and protection program initiated for the Great Basin Canada Goose in parts of the Central and Pacific flyways. The closed season and reduced bag have reduced the kill of breeding and maturing sub-adult birds of this flock. However, populations are still critical and there appears to be a need for continued hunting restrictions.

Table 2. Comparison of Colorado Goose Breeding Ground Surveys - 1959, 1958 and 3-Year Average

| Area | Total Observed Breeding Pairs | | | | | | | | | |
|-------------|-------------------------------|-------------|-------------|---------------|-------------|-------------|---------------|-------------|-------------|-------|
| | 3-Year Average | | | 1958 | | | 1959 | | | Total |
| | Nesting Pairs | Total Young | Total Birds | Nesting Pairs | Total Young | Total Birds | Nesting Pairs | Total Young | Total Birds | |
| Yampa River | 12 | 42 | 74 | 11 | 42 | 90 | 18 | 63 | 106 | |
| Green River | 4 | 32 | 47 | 5 | 64 | 76 | 10 | 40 | 81 | |
| Total | 16 | 74 | 121 | 16 | 106 | 166 | 28 | 103 | 187 | |

Conclusions

Considering the varying water and weather conditions and the rather stable breeding population it is believed the fall duck flights from Colorado's production will be average or above.

Geese still present a critical, although improving picture and indicate a definite need for continued hunting restrictions for the breeding flock in northwest Colorado.

NEBRASKA

Weather and Water Conditions

Weather conditions in the Nebraska Sandhills were generally favorable to the 1959 waterfowl breeding population. Relatively mild weather prevailed during the winter. Most lakes were either clear or mostly clear of ice by the end of the second week of March. Cool weather during the breeding season may have retarded the phenology as much as a week from the locally accepted average and up to three weeks later than 1958.

Weather during the mating and nesting period has been generally cool and dry. Some rain fell during the first ten days of May, in the eastern and central Sandhills. Rains occurred in the western Sandhills up to May 20. Frost occurred in the eastern Sandhills as late as May 14.

Water conditions were only fair in the Nebraska Sandhills this spring. Less than average amounts of snow fell in this area as a whole the past winter. Spring rains did not commence until early May. Most lakes in the eastern Sandhills area were low with the exception of those fed by flowing wells. Small potholes and sloughs were virtually non-existent until after the middle of the migration period. They were drying fast by June 1.

Breeding Population Indices

The aerial surveys indicated that the 1959 breeding duck population in the Sandhills has decreased from that of the 1958 season. According to the survey the population has fallen below the average breeding population for the four prior years. Lack of sufficient water habitat in some areas (eastern) may be related to the decreased population.

NEBRASKA - Continued

Table 1. 1959 Waterfowl Population Indices

| | Eastern | Central | Western | Total |
|---------------------------------|---------|---------|---------|--------|
| Square miles in study area | | | | |
| Stratum A | 3,859 | 2,824 | 4,186 | 10,869 |
| Stratum B | 734 | 1,815 | 2,814 | 5,363 |
| Observed ducks/sq. mile | | | | |
| Stratum A | 6.74 | 8.51 | 9.97 | |
| Stratum B | 0.75 | 0.92 | 1.47 | |
| Aerial survey index* | 26,561 | 25,702 | 45,871 | 98,134 |
| Percent non-breeders | 15.7 | 5.1 | 16.3 | |
| Breeding duck index | 22,408 | 24,385 | 38,407 | 85,200 |
| Percent lone males | 22.3 | 15.0 | 9.4 | |
| Hen-on-nest correction | 5,941 | 3,856 | 4,273 | 14,070 |
| Corrected breeding duck indices | 28,349 | 28,023 | 43,402 | 99,774 |

* Ducks per square mile x square miles in study area.

Table 2. Waterfowl Breeding Population Trends

| | | | |
|--|---------|----------------|---------|
| 1959 aerial index | 98.134 | | |
| 1958 aerial index | 173,805 | change to 1959 | - 44.0% |
| Average, 1955-58 aerial indices | 128,452 | change to 1959 | - 23.6% |
| 1959 breeding duck index* | 99,774 | | |
| 1958 breeding duck index | 176,376 | change to 1959 | - 43.4% |
| Average, 1955-58 breeding duck indices | 117,035 | change to 1959 | - 9.8% |

* Corrected for non-breeding or loafing ducks and hens on nests which could not be seen during aerial surveys.

Table 3. Species Composition and Trends

| Species | Corrected Species Indices* | | | Total | % of 1959 Index | 1958 Index | Percent Change from 1958 to 1959 |
|------------|----------------------------|---------|---------|--------|-----------------------|---------------|--|
| | Eastern | Central | Western | | | | |
| B. W. Teal | 17,363 | 13,910 | 18,870 | 50,143 | 50.3 | 71,301 | - 29.7 |
| Mallard | 2,206 | 5,780 | 4,159 | 12,145 | 12.2 | 28,067 | - 56.7 |
| Baldpate | 545 | 103 | 722 | 1,370 | 1.4 | 1,906 | - 28.1 |
| Shoveler | 2,298 | 2,436 | 5,341 | 10,075 | 10.1 | 20,247 | - 50.2 |
| Pintail | 4,834 | 1,986 | 5,013 | 11,833 | 11.9 | 32,669 | - 63.8 |
| Gadwall | 440 | 1,065 | 4,334 | 5,839 | 5.9 | 10,085 | - 42.1 |
| Scaup | 329 | 483 | 826 | 1,638 | 1.6 | 1,326 | - 23.5 |
| G. W. Teal | 228 | 103 | - | 331 | 0.3 | 751 | - 55.9 |
| Redhead | - | 753 | 1,815 | 2,568 | 2.6 | 6,486 | - 60.4 |
| Ringneck | - | 787 | - | 787 | 0.8 | 147 | - 381.0 |
| Bufflehead | - | 205 | - | 205 | 0.2 | - | - |
| Ruddy | - | 412 | 2,322 | 2,734 | 2.7 | 3,391 | - 19.4 |
| Total | 28,349 | 28,023 | 43,402 | 99,774 | 100.0 | 176,376 | - 43.4 |

* All non-breeding ducks in groups at the time of the surveys were subtracted from the aerial index. All lone males observed were assumed to be territorial and to represent a hen nesting; these hen-on-nests have been added to the breeding duck index to obtain the corrected indices.

NEBRASKA - Continued

Production Indices

All indications are that the 1959 waterfowl production success was at least average. A few broods were reported by the middle of May, but the peak brood occurrence appeared to be somewhat later than average. Brood surveys conducted during the period July 21-23 showed that of 47 broods of all species observed, 24 percent were of age Class I, 68 percent of age Class II, and 8 percent of age Class III. The observed broods were predominantly blue-winged teal, which made up 36 percent of the observations.

Aerial brood counts were not made this year due to difficulty in engaging an aircraft. Ground routes were made, however, in each of the three Sandhills areas. These counts indicated one brood per 4.7 miles in the eastern Sandhills, one brood per 3.6 miles in the central Sandhills, and one brood per 3.2 miles in the western Sandhills.

An average of 5.0 ducklings was observed in the broods of all age classes and all species.

No significant loss of ducklings to natural elements was reported or could be determined. Severe hail storms struck a few Sandhills production areas in July, however, and it is not likely that ducklings in exposed areas could survive. Heavy vegetation in and around most water areas at this time of year, and the extreme local nature of the storms probably helped to hold such losses to a minimum.

Conclusions

From the data available, it may be assumed that the number of ducks entering the flyway from Nebraska in 1959 may show significant decrease from 1958, and a slight decrease from the 1955-58 fall flight average.

SOUTHERN ALBERTA, SOUTHERN SASKATCHEWAN, AND SOUTHERN MANITOBA
(DUCKS UNLIMITED SURVEYS)

Weather and Water Conditions

In most districts in Southern Alberta the number of water areas per sq. mile during May was the lowest recorded. The provincial average was 5.0 against a previous low of 8.7 in 1958.

In southern Saskatchewan average number of water areas during May was reduced to 3.7 per sq. mile, the lowest in the 7 years of record. Previous lows were 8.2 in 1954 and 8.3 in 1958.

In southern Manitoba water levels were apparently more precarious south of Highway #1 than north. Thirty transects in the south averaged only 3.5 areas holding water per sq. mile, while 32 transects north of Highway #1 averaged 18.7 wet areas per sq. mile. There was no water whatever on three of the southern transects, while this condition was not encountered in the north. The general picture seems to show water levels much reduced when compared with conditions existing over the past few years, but, in reality, these levels are probably just returning to normal after a period of abnormally high water.

The most alarming habitat feature, obvious even in casual observation, was the amount of emergent vegetation that has been stranded by receding water levels. Very few potholes offered adequate over-water nesting sites. Thus such species as canvasback, redhead and ruddy may find this requisite of breeding habitat at a premium. On the other hand, conditions for upland nesters seem excellent.

Breeding Population Indices

The Alberta transects show a decrease in breeding pairs of 5.7 percent which is best expressed as unchanged.

The southeast side of the Province from the United States Border to Castor showed a 22 percent decrease. The southwest showed a decrease of 11 percent from 1958 but remained just about at the 9-year average for the district. From Camrose north, there was an overall increase of 17 percent. The information collected is summarized in Table 1.

The Saskatchewan transects show a decrease in the number of breeding pairs of waterfowl of 32 percent. The decrease occurred in both the prairie and aspen parkland and while an increase was registered on the new northern transects from Lloydminster

SOUTHERN ALBERTA, SOUTHERN SASKATCHEWAN, AND
SOUTHERN MANITOBA - Continued

to Meadow Lake and Big River there were too few water areas and ducks to compensate for losses farther south. Aerial surveys from Meadow Lake north and in the Carrot River area in the northeast part of the Province show a good population. There are no previous data in the Meadow Lake area so no comparison is possible but in the Carrot River area a definite increase over 1958 was estimated, particularly in diving species and principally Lesser scaup. The data collected are summarized in Table 2.

In southern Manitoba total breeding pairs decreased 16.6 percent in 1959 as compared with 1958. By far the greater portion of this loss occurred south of Highway #1 (37.6%), whereas north of this route, total breeding pairs were virtually the same in both years (6.1% decrease in 1959). Increases in breeding populations were noted in only 4 species: BWT (4.9%), Gad. (91.8%), Shov. (8.6%), and RH (15.6%). The increases in BWT and Shov. are probably not significant and may not be so for the RH. The marked increase in Gad. was noted both north and south of Highway #1, but was not pronounced in the south. Decreases in breeding populations were found in 8 species: Mal. (37.8%), Pin. (25.0%), Bald. (22.2%), GWT (37.4%), Can. (27.0%), LS (10.0%), RN (37.5%), and Rud. (51.8%). Decreases were noted both north and south of Highway #1 for nearly all of the above species but they were generally more extreme in the south.

Table 1. Alberta Provincial Summary

| | 1952 | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 |
|----------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| Transects Run | 261 | 274 | 275 | 259 | 262 | 263 | 260 | 261 |
| Water Areas | - | 2,989 | 2,765 | 2,286 | 2,605 | 2,330 | 2,263 | 1,316 |
| Breeding Pairs | 4,519 | 6,712 | 6,977 | 6,964 | 6,180 | 6,142 | 7,395 | 6,969 |
| Water Areas/Sq. Mi. | - | 10.9 | 10.0 | 8.8 | 9.9 | 8.8 | 8.7 | 5.0 |
| Breeding Pairs/Sq. Mi. | 17.3 | 24.5 | 25.3 | 26.8 | 23.5 | 23.3 | 28.4 | 26.7 |
| <u>Species Composition</u> | | | | | | | | |
| Pintail | 1,989 | 2,592 | 2,125 | 2,074 | 2,061 | 1,390 | 1,817 | 1,206 |
| Mallard | 1,014 | 1,712 | 1,653 | 1,689 | 1,705 | 1,769 | 1,988 | 1,900 |
| B. W. Teal | 355 | 544 | 995 | 765 | 344 | 712 | 830 | 969 |
| Shoveller | 357 | 510 | 722 | 535 | 489 | 399 | 579 | 521 |
| Lesser Scaup | 291 | 449 | 564 | 798 | 565 | 779 | 948 | 727 |
| Baldpate | 249 | 368 | 368 | 428 | 387 | 411 | 474 | 604 |
| Gadwall | 96 | 99 | 176 | 187 | 161 | 143 | 199 | 400 |
| Redhead | 68 | 138 | 146 | 165 | 132 | 162 | 161 | 121 |
| Canvasback | 35 | 154 | 78 | 130 | 130 | 145 | 179 | 146 |
| G. W. Teal | 42 | 60 | 58 | 98 | 84 | 131 | 139 | 273 |
| Ruddy | 13 | 53 | 48 | 55 | 85 | 69 | 57 | 52 |
| Bufflehead | 1 | 9 | 11 | 13 | 16 | 8 | 6 | 21 |
| Goldeneye | - | 3 | 1 | 4 | 6 | 7 | 2 | 16 |
| Cinnamon Teal | 1 | 1 | 1 | 2 | - | - | - | - |
| W.W. Scoter | 2 | - | - | 3 | 3 | 6 | 3 | 4 |
| Ringneck | 1 | - | - | - | - | - | - | - |
| Wood Duck | - | - | 1 | - | - | - | - | - |
| Unidentified | 5 | 20 | 30 | 18 | 12 | 11 | 13 | 9 |
| Total | 4,519 | 6,712 | 6,977 | 6,964 | 6,180 | 6,142 | 7,395 | 6,969 |

Table 2. Saskatchewan Provincial Summary

| | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 |
|----------------------------|-------|-------|-------------|-------|-------|-------|-------|
| Transects Run | 177 | 177 | 143 | 178 | 177 | 179 | 178 |
| Water Areas | 2,287 | 1,459 | - | 2,920 | 1,729 | 1,462 | 660 |
| Breeding Pairs | 6,582 | 5,335 | - | 6,447 | 4,189 | 4,680 | 3,076 |
| Waters Areas/Sq. Mi. | 12.9 | 8.2 | 14.4 | 16.4 | 9.7 | 8.3 | 3.7 |
| Breeding Pairs/Sq. Mi. | 37.2 | 30.1 | 31.9 | 36.2 | 23.6 | 26.1 | 17.2 |
| <u>Species Composition</u> | | | | | | | |
| Pintail | 2,242 | 1,521 | Impass- | 1,796 | 974 | 972 | 437 |
| Mallard | 1,796 | 1,659 | able | 1,768 | 1,438 | 1,780 | 1,173 |
| B. W. Teal | 671 | 611 | roads | 813 | 503 | 467 | 435 |
| Shoveller | 634 | 490 | in | 561 | 302 | 305 | 240 |
| Baldpate | 455 | 312 | eastern | 355 | 228 | 326 | 197 |
| Gadwall | 205 | 269 | Sask. | 264 | 128 | 176 | 201 |
| Lesser Scaup | 193 | 207 | prevented | 449 | 345 | 343 | 237 |
| Canvasback | 153 | 106 | completion. | 224 | 115 | 146 | 60 |
| Redhead | 103 | 77 | Data | 119 | 63 | 71 | 30 |
| G. W. Teal | 84 | 52 | not | 62 | 54 | 40 | 57 |
| Ruddy | 46 | 29 | comparable. | 24 | 31 | 19 | 4 |
| Ringneck | - | - | | 2 | 5 | - | - |
| Goldeneye | - | - | | - | 1 | - | - |
| Unidentified | - | 2 | | 10 | 2 | 35 | 5 |
| Total | 6,582 | 5,335 | | 6,447 | 4,189 | 4,680 | 3,076 |

Table 3. Manitoba Provincial Summary

| Species | N. of Highway #1 | | S. of Highway #1 | | Total | |
|--------------|------------------|-------|------------------|-------|-------|-------|
| | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 |
| Mallard | 758 | 507 | 204 | 91 | 962 | 598 |
| B. W. Teal | 412 | 562 | 309 | 194 | 721 | 756 |
| Pintail | 174 | 130 | 106 | 80 | 280 | 210 |
| Baldpate | 123 | 100 | 26 | 15 | 149 | 115 |
| Gadwall | 35 | 49 | 26 | 68 | 61 | 117 |
| G. W. Teal | 62 | 44 | 21 | 8 | 83 | 52 |
| Shoveler | 81 | 110 | 81 | 65 | 162 | 175 |
| Canvasback | 123 | 102 | 62 | 27 | 185 | 129 |
| Redhead | 48 | 85 | 48 | 26 | 96 | 111 |
| Lesser Scaup | 238 | 247 | 123 | 78 | 361 | 325 |
| Ringneck | 64 | 52 | 21 | 12 | 85 | 64 |
| Ruddy | 34 | 24 | 22 | 3 | 56 | 27 |
| Bufflehead | 2 | 4 | - | - | 2 | 4 |
| Unidentified | - | 6 | - | - | - | 6 |
| Total | 2,154 | 2,022 | 1,069 | 1,067 | 3,223 | 2,689 |

Mississippi Flyway Data

Waterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1957-58 and 1958-59 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

| Species | 1958-59 | 1957-58 | Percent Change 1957-58 to 1958-59 | |
|---------------------------|------------|-----------|---|--------|
| | | | / | - |
| Mallard | 3,043,796 | 2,587,149 | / | 17.65 |
| G. W. Teal | 356,648 | 289,073 | / | 23.38 |
| B. W. Teal | 240,020 | 276,559 | - | 13.21 |
| Pintail | 180,507 | 199,943 | - | 9.72 |
| Black Duck | 217,372 | 177,943 | / | 22.16 |
| Scaup | 213,270 | 283,652 | - | 24.81 |
| Canvasback | 84,498 | 183,183 | - | 53.87 |
| Redhead | 54,464 | 140,538 | - | 61.25 |
| Ring-necked | 125,708 | 107,561 | / | 16.87 |
| Gadwall | 44,831 | 11,430 | / | 292.22 |
| American Wigeon | 81,258 | 55,701 | / | 45.88 |
| Ruddy | 14,398 | 19,290 | - | 25.36 |
| Shoveler | 32,102 | 27,285 | / | 17.65 |
| Merganser | 35,017 | 22,587 | / | 55.03 |
| Goldeneye | 38,070 | 44,135 | - | 13.74 |
| Bufflehead | 15,985 | 26,608 | - | 39.92 |
| Scoter | 2,785 | 1,987 | / | 40.16 |
| Wood Duck | 123,915*** | 60,760** | / | 103.94 |
| Others | 1,460 | 2,078 | - | 29.74 |
| Total Ducks Retrieved | 4,906,104 | 4,517,462 | / | 8.60 |
| Total Ducks not Retrieved | 1,107,988 | 1,110,958 | - | .27 |
| Total Duck Kill | 6,014,092 | 5,628,420 | / | 6.85 |
| Canada Goose* | 212,892 | 163,244 | / | 30.41 |
| Blue Goose | 47,429 | 50,798 | - | 6.63 |
| Snow Goose | 31,586 | 31,922 | - | 1.05 |
| White-fronted Goose | 5,790 | 15,477 | - | 62.59 |
| Total Geese Retrieved | 297,697 | 261,441 | / | 13.87 |
| Total Geese not Retrieved | 79,361 | 55,658 | / | 42.59 |
| Total Goose Kill | 377,058 | 317,099 | / | 18.91 |
| Total Coots Retrieved | 295,146 | 258,768 | / | 14.06 |
| Total Coots not Retrieved | 63,796 | 64,018 | - | .35 |
| Total Coot Kill | 358,942 | 322,786 | / | 11.20 |

* Includes all White-cheeked Geese as Canada Geese.

** Closed season on Wood Ducks in the States of Kentucky, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri and Wisconsin.

***Closed season on Wood Ducks in the States of Kentucky, Illinois, Iowa, Michigan, Minnesota, Missouri, Wisconsin, Indiana and Arkansas.

Mississippi Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill and Daily Bag as Determined by the Waterfowl Hunter Mail Survey.

| | | | | Percent Change 1957-58 to 1958-59 |
|---|----------------|------------------|----------|---|
| | 1958-59 | 1957-58 | | |
| Number of Potential Hunters | | | | |
| 16 and over* | 924,628 | 1,004,255 | - | 7.93 |
| Under 16 | 69,832 | 75,300 | - | 7.26 |
| Total | 994,460 | 1,079,555 | - | 7.88 |
| Number of Active Hunters** | | | | |
| 16 and over | 817,186 | 870,192 | - | 6.09 |
| Under 16 | 53,671 | 58,180 | - | 7.75 |
| Total | 870,857 | 928,372 | - | 6.20 |
| Average Times Hunted** | 3.901 | 4,289 | - | 9.05 |
| Average Seasonal Bag** | | | | |
| <u>16 and over</u> | Ducks | 5.786 | 5.184 | + 11.61 |
| | Geese | .358 | .302 | + 18.54 |
| | Coots | .332 | .296 | + 12.16 |
| <u>Under 16</u> | Ducks | 3.309 | 2.376 | + 39.27 |
| | Geese | .103 | .112 | - 8.04 |
| | Coots | .439 | .142 | + 209.15 |
| Average Seasonal No. not Retrieved** | | | | |
| <u>16 and over</u> | Ducks | 1.318 | 1.222 | + 7.86 |
| | Geese | .095 | .061 | + 55.74 |
| | Coots | .071 | .068 | + 4.41 |
| <u>Under 16</u> | Ducks | .574 | .801 | - 28.34 |
| | Geese | .025 | .043 | - 41.86 |
| | Coots | .111 | .083 | + 33.73 |
| Average Daily Bag** | | | | |
| <u>16 and over</u> | Ducks | 1.483 | 1.209 | + 22.66 |
| | Geese | .091 | .070 | + 30.00 |
| | Coots | .085 | .069 | + 23.19 |
| <u>Under 16</u> | Ducks | .848 | .554 | + 53.07 |
| | Geese | .026 | .026 | N.C. |
| | Coots | .113 | .033 | + 242.42 |

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once.

Winter Trend Data - Mississippi Flyway

Weather conditions during the survey period were variable, but in general the coverage was good and the figures obtained were at least as accurate and complete as those gathered during past years. In the northern portion of the Flyway, unusually cold weather concentrated the birds, thereby facilitating counting. In the southern portion of the Flyway, icing conditions occurred over much of the wintering ground during the survey period, but the operations was hampered only briefly and the general feeling was that a new high in efficiency was reached. One important area still lacks adequate coverage--the off-shore waters along the Louisiana Coast. This results each year in variable proportions of the scaup population being included in the count. To date, a remedy to this problem has not been found.

The total numbers of ducks, geese, and coot as recorded in the Flyway during the January surveys of 1958 and 1959 were remarkably similar. When the ducks were divided into dabblers and divers, the same thing remained true.

Among the species, the blue-winged teal made the most spectacular showing in 1959. The 1958 figure was the highest on record up to that time, but this year's population was almost twice as great. This increase probably reflects a change in habitat rather than change in overall numerical strength of the species. Superb food conditions in the Louisiana Coastal marshes, an aftermath of otherwise destructive Hurricane Audrey, apparently explains the difference. Normally, these birds migrate farther south. A major increase in shoveller probably has a similar explanation, as may a lesser increase in green-winged teal.

The mallard wintering population shows no appreciable change from 1958, yet there may be cause for some concern. An apparent decrease in 1958 as compared to 1957 was apparently the result of a large increase in the number of birds remaining along the Missouri River in South Dakota and in Nebraska, a location from which these birds normally move into the Mississippi Flyway. This year, however, these two central flyway States "lost" nearly a million mallards as compared to 1958, and there was no corresponding increase anywhere in the Central Flyway. If the 1958 wintering population of mallards along the Missouri River was in fact a part of the Mississippi Flyway population, then the decrease recorded this year in the Central Flyway may be more a reflection of change in the Mississippi Flyway.

A rather sharp decrease in the Flyway black duck population was nearly equalled by an increase in the lower Atlantic Flyway. Whether this is happenstance or cause and effect is uncertain.

The population of canvasback and redhead continued to decrease despite the restrictions in the bag limit last fall. Although a moderate increase was recorded for scaup, due to the problems of adequately censusing this species, there is question as to whether or not the data properly reflects a trend in population.

A moderate decrease was recorded for the blue goose. The Canada goose population increased slightly and reached the highest levels that have been recorded since the annual winter survey was initiated in 1935.

The two tables which follow compare the 1958 and 1959 data by area and by species.

In the graph which follows the tables are presented trend data for ducks, geese, and coot for the period 1949 to 1959. Although coverage during the period has not been strictly comparable, the data have been adjusted to make them as comparable as possible. Generally speaking, there has been a slight upward trend in the wintering populations of ducks during the 11-year period. The goose population has remained relatively stable although the population during the last years has been somewhat above the average of the previous 5 years. Coot populations seemed to have fluctuated considerably during the period, although since 1953, there seems to have been a fairly consistent recovery from the low point reached in that year.

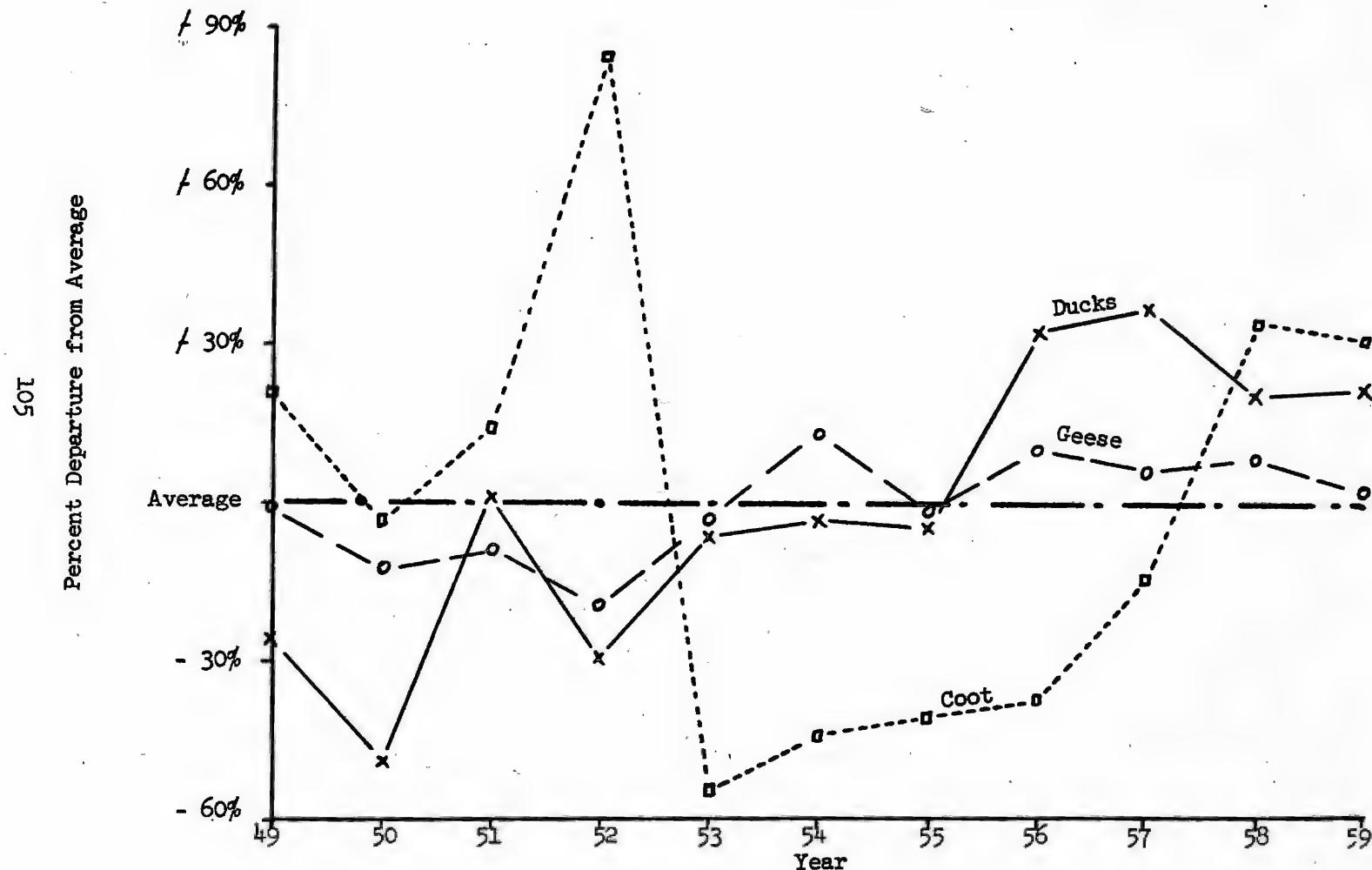
Percent Change from 1958 to 1959 in Duck, Goose, Swan and Coot Populations in the Mississippi Flyway (Comparable Coverage)

| Area | Ducks | Geese | Swan | Coot | Total |
|---------------------------|-------|-------|------|------|-------|
| Ontario | + 2 | - 29 | - | - | + 1 |
| Mississippi Flyway States | + 2 | - 5 | - 27 | - 2 | + 1 |
| TOTAL | + 2 | - 5 | - 27 | - 2 | + 1 |

Species Composition - Mississippi Flyway - 1958 and 1959
 (Comparable Coverage)

| Species | Percent of Birds Identified | | Percent Change |
|-----------------------|-----------------------------|------|----------------|
| | 1958 | 1959 | |
| <u>Dabbling Ducks</u> | | | |
| Mallard | 51.8 | 49.9 | - 2.6 |
| Pintail | 7.2 | 7.1 | - 0.1 |
| Gadwall | 4.4 | 4.0 | - 6.6 |
| G. W. Teal | 4.0 | 5.3 | + 33.6 |
| Baldpate | 3.7 | 2.8 | - 25.1 |
| Black Duck | 3.5 | 2.4 | - 30.4 |
| B. W. Teal | 2.0 | 4.1 | + 104.4 |
| Shoveler | 1.9 | 3.1 | + 67.9 |
| Wood Duck | .5 | .6 | + 14.4 |
| <u>Sub-Total</u> | 79.0 | 79.3 | + 1.5 |
| <u>Diving Ducks</u> | | | |
| Scaup | 3.1 | 3.9 | + 26.2 |
| Canvasback | 1.3 | .9 | - 28.9 |
| Ringneck | .8 | .8 | - 4.6 |
| Goldeneye | .6 | .8 | + 33.7 |
| Redhead | .4 | .2 | - 48.6 |
| Ruddy | .3 | .5 | + 62.1 |
| Bufflehead | .1 | Tr. | - 71.6 |
| <u>Sub-Total</u> | 6.6 | 7.1 | + 7.5 |
| <u>Misc. Ducks</u> | | | |
| Merganser | .7 | .6 | - 2.7 |
| Old Squaw | .2 | .2 | - 10.7 |
| Scoter & Eider | Tr. | Tr. | - |
| <u>Sub-Total</u> | .9 | .8 | - 4.4 |
| <u>Geese</u> | | | |
| Blue Goose | 4.8 | 4.0 | - 15.5 |
| Canada Goose | 4.2 | 4.3 | + 5.4 |
| Snow Goose | .5 | .6 | + 16.8 |
| White-fronted Goose | .2 | .1 | - 46.8 |
| <u>Sub-Total</u> | 9.7 | 9.0 | - 5.3 |
| Whistling Swan | Tr. | Tr. | - 27.2 |
| Coot | 3.8 | 3.7 | - 2.4 |
| <u>GRAND TOTAL</u> | 100.0 | 99.9 | + 1.0 |

Trend in Duck, Goose and Coot Populations - Mississippi Flyway
1949 through 1959 (Comparable Coverage)



NORTHERN SASKATCHEWAN, NORTHERN MANITOBA, AND ONTARIO

Weather and Water Conditions

Early warm periods in April and May produced an early northward movement of waterfowl and at first it was believed that an early season would develop. However, successive cold periods of rain and snow swept over the survey area all through May.

Phenological development which was from 10 to 15 days later than a "normal" season and possibly may be as much as three weeks later than last year.

Solid pack ice was found in northern Ontario north of Winisk Lake and snowstorms were more common than sunny days. In southern Ontario west of 86° longitude heavy rainstorms resulted in an abundance of water. Most of the lakes were filled to capacity and the rivers and streams were overflowing their banks.

In the Saskatchewan River Delta in northern Manitoba, water levels were reported to be the lowest in 30 years. Runoff in the Saskatchewan River drainage was almost nonexistent. Although this situation reduced the total acreage of waterfowl nesting cover and tended to concentrate the birds, it might be that it will be compensated by the lack of nest destruction due to flooding of the Delta.

In the remainder of northern Manitoba water levels appeared to be below normal although not to such a degree as to significantly affect waterfowl nesting. The northern one-third of Manitoba was still in solid ice and snow on June 10.

The forested areas of northern Saskatchewan also show evidence of partial drought conditions. Water levels in the lakes and marshes were below normal and the runoff from the streams and rivers was significantly reduced.

The northern one-fourth of Saskatchewan was frozen as of June 10 and as near as could be determined, it appeared that many of the northern migrants had been held back by the "ice line" for there were large flocks of mixed species and courting flights involving 4 to 8 birds were common.

Breeding Population Indices

Large flocks of waterfowl were observed throughout the survey area in northern Manitoba and Saskatchewan. It is

NORTHERN SASKATCHEWAN, NORTHERN MANITOBA,
AND ONTARIO - Continued

difficult to say whether these birds will go into production. Many are undoubtedly displaced birds from the prairies and reflect the adverse nesting conditions prevalent there.

The status of the breeding population on a strata basis is given in Table 1.

The breeding population indices by Province for the period 1955 through 1959 are presented in Table 2.

The percent of lone drakes at the time of the survey for 1958 and 1959 was as follows:

| <u>Province</u> | <u>1958</u> | <u>1959</u> |
|-----------------|-------------|-------------|
| N. Saskatchewan | 23% | 28% |
| N. Manitoba | 30% | 23% |
| Ontario | 38% | 37% |

Generally speaking, the percent of lone drakes was low during both 1958 and 1959, indicating that not much nesting was underway at the time of the survey.

Table 1. Breeding Population by Strata (1959) and Comparison with 1958 Totals

| Species | STRATA | | | | | 1959 Total | 1958 Total | Percent Change |
|----------------------------|---------|---------|---------|----------------|----------------|------------|------------|----------------|
| | Ontario | Man. D. | Man. C. | Sask. C. South | Sask. C. North | | | |
| Mallard | 45,000 | 32,930 | 38,940 | 81,240 | 47,000 | 245,110 | 263,850 | - 7 |
| Scaup | 63,560 | 22,470 | 83,140 | 63,090 | 96,860 | 329,120 | 269,100 | +22 |
| Merganser | 52,970 | - | 14,890 | 15,840 | 22,290 | 105,990 | 217,950 | -51 |
| Canvasback | - | 19,440 | - | 7,920 | | 27,360 | 21,600 | +27 |
| Goldeneye | 79,460 | 8,990 | 44,200 | 42,150 | 12,360 | 187,160 | 69,150 | +171 |
| Bufflehead | 7,950 | - | 2,520 | 5,360 | 7,500 | 23,330 | 19,750 | +18 |
| Black Duck | 15,890 | - | - | - | | 15,890 | 5,550 | +186 |
| Baldpate | - | 6,060 | 5,270 | 5,360 | | 16,690 | 8,300 | +101 |
| Pintail | - | 6,060 | 2,520 | 7,920 | | 16,500 | 6,500 | +154 |
| B.W. Teal | - | 4,390 | - | 5,360 | 2,430 | 12,180 | 18,050 | - 33 |
| Scoter | - | - | 31,830 | 2,550 | 29,790 | 64,170 | 36,050 | + 78 |
| G.W. Teal | - | 1,880 | 3,890 | 7,920 | 2,430 | 16,120 | - | |
| Gadwall | - | 2,300 | 1,830 | 5,360 | | 9,490 | - | |
| Shoveler | - | - | - | 5,360 | | 5,360 | - | |
| Total Ducks 1959 | 264,830 | 104,520 | 229,030 | 255,430 | 220,660 | 1,074,470 | | |
| Total Ducks 1958 | 277,600 | 82,400 | 164,950 | 153,500 | 257,400 | | 935,850 | |
| Percent Change 1958 - 1959 | -5 | +27 | +39 | +66 | -14 | | +15 | |
| Coot - 1959 | - | 11,950 | | 746 | | | | |
| Canada Geese 1959 | - | 16,860 | 2,541 | | 15,969 | | | |

Table 2. Total Duck Indices by Provinces 1955 - 1959

| Province | Indices | | | | | Average | Percent Change | |
|-----------------|-----------|---------|---------|---------|-----------|---------|----------------|------------|
| | 1955 | 1956 | 1957 | 1958 | 1959 | | From '58 | From Aver. |
| Ontario | 230,160 | 111,680 | 176,350 | 277,600 | 264,830 | 190,890 | - 5 | + 39 |
| N. Manitoba | 380,430 | 197,290 | 279,540 | 247,350 | 333,550 | 276,150 | +35 | + 21 |
| N. Saskatchewan | 658,650 | 262,580 | 490,240 | 410,900 | 476,090 | 455,590 | +16 | + 4 |
| Total | 1,269,240 | 571,550 | 946,130 | 935,850 | 1,074,470 | 922,630 | +14 | + 16 |

NORTHERN SASKATCHEWAN, NORTHERN MANITOBA, AND ONTARIO - continued

Production Indices

The status of waterfowl production within the survey area is given in table 3. Additional data comparing the 1959 production survey with previous years is shown in tables 4 and 5.

From the information presented in Table 3 it appears that production in northern Manitoba will exceed that in 1956 but will be less than that of 1955. In northern Saskatchewan the 1959 production will likely be reasonably comparable to that of both 1955 and 1956. It is of interest to note that the breeding population in these two areas was larger in 1955 than it was in 1959 (+38% and +14% in N. Saskatchewan and N. Manitoba respectively). In 1956 the breeding population in these two areas was considerably less than in 1959. Therefore, it would appear that production in these areas was proceeding this year at what might be considered a normal rate.

Table 3. Comparison of Young and Late Nesting Index - 1959 to 1955 and 1956

| Stratum | 1955 | 1956 | 1959 | 1955 | 1956 | 1959 |
|---------------|---------|---------|---------|--------|--------|--------|
| Manitoba C | 58,958 | 1,936 | 25,170 | 29,128 | 2,128 | 9,128 |
| Manitoba D | 29,525 | 7,330 | 19,864 | 10,408 | 7,037 | 3,518 |
| Sub-Total | 88,483 | 9,266 | 45,034 | 39,536 | 9,165 | 12,646 |
| Sask. C South | 45,820 | 11,026 | 61,769 | 10,530 | 4,794 | 9,250 |
| Sask. C North | 80,066 | 86,386 | 58,068 | 13,244 | 27,767 | 17,420 |
| Sub-Total | 125,886 | 97,412 | 119,837 | 23,774 | 32,561 | 26,670 |
| GRAND TOTAL | 214,369 | 106,678 | 164,871 | 63,310 | 41,726 | 39,316 |

Table 4. Brood and Late Nesting Index Data Recorded

| DUCKS Broods | STRATA | | | |
|-----------------------------|------------|------------|---------------|---------------|
| | Manitoba C | Manitoba D | Sask. C South | Sask. C North |
| Class I | 2 | 14 | 3 | 0 |
| Class II | 6 | 23 | 27 | 5 |
| Class III | 11 | 26 | 57 | 4 |
| Unclassified | 0 | 0 | 1 | 0 |
| Total Broods | 19 | 63 | 88 | 9 |
| | | | | |
| Complete II & III Broods | 16 | 36 | 63 | 7 |
| No. in Broods | 77 | 155 | 297 | 31 |
| Average | 4.8 | 4.3 | 4.7 | 4.4 |
| | | | | |
| Identified Pairs | 10 | 11 | 14 | 2 |
| Identified Singles | 14 | 30 | 21 | 6 |
| Unidentified Pairs | 5 | 4 | 12 | 1 |
| Unidentified Singles | 4 | 3 | 15 | 3 |
| LATE NESTING INDEX | 33 | 48 | 62 | 12 |

Table 5. Comparison of Brood Classification

| Stratum | Class I | | | Class II | | | Class III | | |
|---------------|---------|------|------|----------|------|------|-----------|------|------|
| | 1955 | 1956 | 1959 | 1955 | 1956 | 1959 | 1955 | 1956 | 1959 |
| Manitoba C | 22 | 10 | 2 | 15 | 1 | 6 | 5 | 0 | 11 |
| Manitoba D | 29 | 16 | 14 | 14 | 4 | 23 | 2 | 0 | 26 |
| Sask. C South | 27 | 4 | 3 | 23 | 10 | 27 | 4 | 2 | 57 |
| Sask. C North | 10 | 19 | 0 | 6 | 5 | 5 | 1 | 0 | 4 |
| Total | 88 | 49 | 19 | 58 | 20 | 61 | 12 | 2 | 98 |
| Percent | 56% | 69% | 11% | 37% | 28% | 34% | 7% | 3% | 55% |

Conclusions

On the basis of an increase in the size of the breeding population, plus an indication that production was proceeding normally, it is concluded that there will be a moderate increase in the fall flight of ducks from northern Saskatchewan and northern Manitoba during 1959. In view of the small decrease in the size of the breeding population in Ontario and the very retarded spring, it is estimated that there will be a small decrease in the fall flight from this area.

SOUTHERN MANITOBA

Weather and Water Conditions

The breakup in 1959 was abnormally early, following an unusually cold and open winter.

Most of the snowfall occurred in mid-November, contributing heavy precipitation in the eastern portion of the area, but much less in the west. Another snowfall in February and light rains in early May did little to reverse the drying trend in the western portion of the area. Relatively heavy rains on May 26 contributed considerable runoff over the entire area and further rains the following two days contributed to surface water in the southern portions. Although the drying trend has continued in the western portion of the area including the whole of stratum "A" (Table 1), there was still abundant water in stratum "B."

Although the number of water areas in stratum "A" was lower than any previous year shown and levels have been falling steadily, there is still considerable carryover of water in the larger potholes. In the major portion of stratum "A," these larger areas are now about the same level they were in 1954. The loss has been in the small temporaries. While the loss of water may have an influence on the nesting population, it is not anticipated that there will be a shortage of water for broods in any of the area covered.

The most conspicuous aspect of the habitat is the scarcity of emergent vegetation. There has still been no recovery since emergent cover was flooded out by the rising waters of 1955 and 1956. Thus over-water nesting cover is greatly reduced and the remaining is of generally poor quality.

The weather was warm in April and cool in May, but without severe blizzards or hard freezes, although several below freezing readings were recorded. However, very severe dust storms were experienced May 11 and 12. This did extensive damage to farmlands and necessitated reseeding of early crops in many cases.

Burning of pothole margins and brushland was again prevalent, though not as severe as in 1958.

Habitat Conditions

Although there were rains during June, particularly in the eastern portion of the area, the drying trend continued, as is shown in Table 2. The reduction in number of water areas was most severe in stratum "A", but was also sufficiently severe in stratum "B" to give us the lowest water area index for the six year period.

Table 1. Water Area Index - Southern Manitoba - May Aerial Survey

| Year | Ponds in Stratum "A" | Ponds in Stratum "B" | Ponds in Strata "A" & "B" |
|--------------------|-------------------------|-------------------------|------------------------------|
| 1951 | 240,500 | 185,900 | 426,400 |
| 1952 | 174,200 | 155,400 | 329,600 |
| 1953 | 186,600 | 311,700 | 498,300 |
| 1954 | 258,200 | 1,075,400 | 1,333,600 |
| 1955 | 314,700 | 427,700 | 742,400 |
| 1956 | 390,700 | 614,800 | 1,005,500 |
| 1957 | 262,200 | 404,000 | 666,200 |
| 1958 | 351,500 | 264,400 | 615,900 |
| 1959 | 160,400 | 482,100 | 642,500 |
| <hr/> | | | |
| Average 1951-59 | 259,900 | 435,700 | 695,600 |
| <hr/> | | | |

Although the reduction in water levels may have affected nesting and may increase predation on the young by eliminating good brood cover, there is sufficient water remaining in areas where there are broods so that they will not be actually stranded by the complete drying up of all neighboring water areas.

Breeding Population Indices

The conspicuous feature of the nesting population as in 1958 was the great number of birds in flocks consisting of both drakes and hens. While this was not quite so prevalent for ducks as in 1958 (table 2), coots remained flocked throughout the survey period and very few were seen dispersed as nesting pairs. The May population showed a considerable decrease from 1958 (table 2) and was slightly below the nine-year average. This reduction was more conspicuous in stratum "A" than in well-watered stratum "B."

Tables 3 and 4 indicate the status of the various species.

Blue-winged teal, shoveller and ringneck are the only species to show an increase. Decreases were most noticeable in the pintail, baldpate and canvasback.

Table 5 gives an indication of the status of the various species during the last seven years. Blue-winged teal and ringneck are at their peak with shovellers close to their peak. Scaup and canvasback in 1959 were at the second lowest numbers recorded, while pintails are at their lowest. In the more important species, there is a definite trend toward a reduction from the high years.

Coot population, as shown in table 6, show a surprising trend. They are at an all-time high in Manitoba, mainly clustered in well-watered stratum "B." However, as pointed out above, there was no evidence of nesting during the period of the survey, May 9-21.

The bulk of the population was retarded in nesting as evidenced by the percentage of lone males observed in the early nesting species (table 7). In spite of the early breakup and early arrivals of the birds, the percentage of mallards, pintails, and canvasbacks observed as lone males was the lowest in the last seven years. This is taken as an indication that productivity would be reduced by retarded nesting.

Table 2. Water Area Index - Southern Manitoba - July Aerial Survey

| Year | Ponds in Stratum "A" | Ponds in Stratum "B" | Total in Strata "A" and "B" |
|----------------------|-------------------------|-------------------------|--------------------------------|
| 1954 | 472,400 | 384,200 | 856,600 |
| 1955 | 339,300 | 270,900 | 610,200 |
| 1956 | 425,900 | 411,600 | 837,500 |
| 1957 | 241,700 | 259,700 | 501,400 |
| 1958 | 163,300 | 341,000 | 504,300 |
| 1959 | 95,500 | 324,500 | 420,000 |
| Average 1954-1959 | 289,700 | 332,000 | 621,700 |

Table 3. May Waterfowl Population Indices - Southern Manitoba -
Aerial Survey

| Year | Stratum "A" | | Stratum "B" | | Strata "A" & "B" | |
|--------------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|
| | Pairs & Drakes | Flocked Ducks | Pairs & Drakes | Flocked Ducks | Pairs & Drakes | Flocked Ducks |
| 1951 | 472,800 | | 165,900** | | 638,700* | |
| 1952 | 343,200 | | 177,300 | | 520,500 | |
| 1953 | 209,400 | | 151,600 | | 361,000 | |
| 1954 | 317,100 | | 228,300 | | 545,400 | |
| 1955 | 345,100 | | 424,200 | | 769,300 | |
| 1956 | 417,200 | | 499,600 | | 916,800 | |
| 1957 | 420,300 | | 440,000 | | 860,300 | |
| 1958 | 561,900 | 145,000** | 394,900 | 153,800** | 956,800 | 298,800** |
| 1959 | 349,900 | 94,500** | 331,300 | 128,600** | 681,200 | 223,100** |
| Average 1951-59 | 381,900 | | 312,500 | | 694,400 | |

* Stratum "B" data not corrected for absent hens in 1951.

** Flocks of drakes and hens of species normally breeding in the area and not assumed to be migrants.

Table 4. Waterfowl Indices by Species - Southern Manitoba - May 1958

| Species | Stratum "A" | | Stratum "B" | | Strata "A" & "B" | |
|--------------|----------------|----------------|----------------|----------------|------------------|----------------|
| | Pairs & Drakes | Flocked Ducks | Pairs & Drakes | Flocked Ducks | Pairs & Drakes | Flocked Ducks |
| Pintail | 47,000 | 2,500 | 26,100 | - | 73,100 | 2,500 |
| Mallard | 281,600 | 10,900 | 208,900 | 10,200 | 490,500 | 21,100 |
| Baldpate | 33,500 | 17,700 | 19,500 | 20,200 | 53,000 | 37,900 |
| Shoveller | 20,500 | - | 7,700 | - | 28,200 | - |
| Gadwall | 4,600 | - | 3,100 | - | 7,700 | - |
| B. W. Teal | 80,400 | 12,700 | 44,500 | 3,300 | 124,900 | 16,000 |
| G. W. Teal | 6,200 | - | 1,000 | - | 7,200 | - |
| Scaup | 35,700 | 93,500 | 34,800 | 110,300 | 70,500 | 203,800 |
| Canvasback | 32,500 | 4,400 | 24,100 | - | 56,600 | 4,400 |
| Redhead | 10,700 | 200 | 15,900 | 5,100 | 26,600 | 5,300 |
| Ringneck | 2,500 | 1,300 | 3,100 | - | 5,600 | 1,300 |
| Ruddy | 4,700 | 1,800 | 1,500 | - | 6,200 | 1,800 |
| Goldeneye | 200 | 100 | 2,100 | 4,600 | 2,300 | 4,700 |
| Bufflehead | 800 | - | 2,600 | - | 3,400 | - |
| Scoter | 700 | - | - | - | 700 | - |
| Wood Duck | 200 | - | - | - | 200 | - |
| Total | 561,900 | 145,000 | 394,900 | 153,800 | 956,800 | 298,800 |

Table 5. Waterfowl Population Indices by Species - Southern Manitoba - May 1959

| Species | Stratum "A" | | Stratum "B" | | Strata "A" & "B" | | Species* Percent Composi- tion | Percent Change 1958-59 |
|------------|-------------------|------------------|-------------------|------------------|-------------------|------------------|--------------------------------------|------------------------------|
| | Pairs & Drakes | Flocked Ducks | Pairs & Drakes | Flocked Ducks | Pairs & Drakes | Flocked Ducks | | |
| Pintail | 17,900 | 1,000 | 22,900 | 10,000 | 40,800 | 11,000 | 6.0% | - 44.2 |
| Mallard | 157,700 | 600 | 145,900 | - | 303,600 | 600 | 44.6% | - 38.1 |
| Baldpate | 15,800 | 8,800 | 13,800 | 7,200 | 29,600 | 16,000 | 4.3% | - 44.2 |
| Shoveller | 18,900 | 200 | 17,100 | 11,900 | 36,000 | 12,100 | 5.3% | + 27.7 |
| Gadwall | 3,500 | 400 | 1,400 | - | 4,900 | 400 | .7% | - 36.4 |
| B. W. Teal | 72,100 | 1,100 | 68,700 | 16,200 | 140,800 | 17,300 | 20.7% | + 12.7 |
| G. W. Teal | 2,100 | - | 2,400 | - | 4,500 | - | .7% | - 37.5 |
| Scaup | 27,000 | 72,000 | 21,000 | 58,300 | 48,000 | 130,300 | 7.0% | - 31.9 |
| Canvasback | 14,100 | 900 | 3,800 | - | 17,900 | 900 | 2.6% | - 68.4 |
| Redhead | 11,900 | 5,400 | 11,400 | 9,500 | 23,300 | 14,900 | 3.4% | - 12.4 |
| Ringneck | 1,800 | 1,000 | 8,100 | 4,800 | 9,900 | 5,800 | 1.5% | + 76.8 |
| Ruddy | 5,400 | 1,200 | 3,300 | 3,600 | 8,700 | 4,800 | 1.3% | + 40.3 |
| Goldeneye | 700 | 300 | 8,600 | - | 9,300 | 300 | 1.4% | + 304.3 |
| Bufflehead | 1,000 | - | 2,900 | - | 3,900 | - | .6% | + 14.7 |
| Scoter | - | 1,600 | - | 7,100 | - | 8,700 | - | |
| Total | 349,900 | 94,500 | 331,300 | 128,600 | 681,200 | 223,100 | 100.1% | - 28.8 |

* The species composition and percent change data refer only to those birds seen as singles and pairs.

Table 6. Trends in May Waterfowl Populations by Species - Southern Manitoba - 1953-1959

| Species | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 |
|------------|---------|---------|---------|---------|---------|---------|---------|
| Pintail | 46,000 | 62,400 | 129,500 | 150,000 | 99,300 | 73,100 | 40,800 |
| Mallard | 150,100 | 252,500 | 355,700 | 491,000 | 500,000 | 490,500 | 303,600 |
| Baldpate | 12,900 | 17,100 | 27,700 | 26,700 | 24,700 | 53,000 | 29,600 |
| Shoveller | 3,600 | 18,800 | 25,100 | 27,800 | 38,300 | 28,200 | 36,000 |
| Gadwall | 8,100 | 8,300 | 8,200 | 5,000 | 5,500 | 7,700 | 4,900 |
| B. W. Teal | 38,800 | 66,700 | 87,800 | 53,200 | 62,700 | 124,900 | 140,800 |
| G. W. Teal | - | 7,900 | 3,900 | 1,700 | 3,400 | 7,200 | 4,500 |
| Scaup | 77,900 | 40,300 | 54,000 | 78,800 | 60,200 | 70,500 | 48,000 |
| Canvasback | 11,600 | 30,300 | 28,400 | 39,200 | 31,400 | 56,600 | 17,900 |
| Redhead | 12,000 | 17,600 | 25,200 | 20,900 | 16,900 | 26,600 | 23,300 |
| Ringneck | - | 4,100 | 1,500 | 7,000 | 3,800 | 5,600 | 9,900 |
| Ruddy | - | 4,500 | 12,300 | 6,700 | 7,000 | 6,200 | 8,700 |
| Goldeneye | - | 6,400 | 4,000 | 4,500 | 5,400 | 2,300 | 9,300 |
| Bufflehead | - | 7,900 | 5,700 | 1,900 | 400 | 3,400 | 3,900 |
| Other | - | 600 | 300 | 2,400 | 1,300 | 900 | - |
| Total | 361,000 | 545,400 | 769,300 | 916,800 | 860,300 | 956,800 | 681,200 |

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Note: This table does not include those birds recorded as "flocked ducks."
 Except for scaup, this category was important only in 1958 and 1959.

Table 7. May Coot Populations - Southern Manitoba

| Year | Stratum "A" | Stratum "B" | Strata "A" & "B" |
|------|-------------|-------------|------------------|
| 1954 | 10,600 | 2,800 | 13,400 |
| 1955 | 16,200 | 12,300 | 28,500 |
| 1956 | 27,600 | 12,400 | 40,000 |
| 1957 | 15,400 | 5,400 | 20,800 |
| 1958 | 52,500 | 28,400 | 80,900 |
| 1959 | 24,600 | 97,700 | 122,300 |

Table 8. Percent Lone Drakes in Mallard, Pintail and Canvasback - Southern Manitoba

| Year | % Lone ♂ Stratum "A" | % Lone ♂ Stratum "B" | % Lone ♂ Strata "A" & "B" |
|------|-------------------------|-------------------------|------------------------------|
| 1953 | 70.0 | 70.1 | 70.1 |
| 1954 | 74.4 | 86.7 | 79.6 |
| 1955 | 81.9 | 91.4 | 87.5 |
| 1956 | 73.7 | 83.6 | 79.4 |
| 1957 | 86.5 | 91.5 | 89.2 |
| 1958 | 80.0 | 84.6 | 81.9 |
| 1959 | 62.1 | 78.5 | 69.9 |

Production Indices

Table 9 shows for the six year period 1954-1959 brood and late nesting indices for both ducks and coots. Although duck broods have been sharply reduced from 1957 and 1958, they are still higher than in the previous three years. The duck late nesting index shows a perceptible drop from 1958, all in stratum "A", but is still higher than the previous years. Nesting effort appears to be continuing at a much higher rate in relatively well watered stratum "B". Coot broods were at an extreme low while their late nesting index was somewhat reduced from that of 1958. Coots have definitely shifted from stratum "A" to stratum "B".

Table 10 shows the species composition of the late nesting population. The only species not showing a measureable decrease were mallard, blue-winged teal, ruddy duck, goldeneye and bufflehead. The latter two species occur in numbers too small to provide a true measure of change. Green-winged teal were for the most part recorded as blue-wings and changes in their July population are not measurable.

Broods seen were not recorded as to species. However, it is important to note that no redhead broods and only one canvasback brood were seen by the aircrew. The latter was not seen on a regular transect. These two species had a complete nesting failure in Southern Manitoba.

It is probable that the late nesting index is somewhat inflated by large numbers of mallard hens which occurred in small groups apparently preparing to moult on the potholes of the survey area. Any of these seen singly or in pairs where they could not be identified were included in the late nesting index. This also occurred to some extent in blue-winged teal. Every effort was made not to record these grouped hens as class III broods. However, it is not known whether we missed class III broods by being too careful or recorded too many.

While there was a sharp reduction from 1958 in the brood index, the high percentage of broods in class I (Table 11) indicates that the hatch was probably continuing through the survey period. This is born out by the still relatively high late nesting index for most species.

The average size of Class II and III broods (Table 12) was low. It may be that this is related to the delayed hatch from a nesting population which arrived on the nesting grounds relatively early.

Conclusions

According to the survey data collected it is anticipated that the fall flight from southern Manitoba will be considerably less than in 1958 but just slightly below the average for the years 1954 - 1958. The low number of broods and ponds is balanced by the fact that the hatch was continuing at the time of the survey. However, two factors should be borne in mind when appraising this forecast. The first is that broods and adults were more easily seen under the drying conditions than in former years. The second is that Manitoba apparently has received a temporary increase in breeders as the result of intense drought in southern Saskatchewan. The increase received in 1958 apparently did not produce enough to sustain itself, and in all likelihood will not do so this year.

Table 9. July Indices for Southern Manitoba 1954 to 1959

| Year | Brood Index | Late Nesting Index | Coot Brood Index | Coot Late Nesting Index |
|---------------------------|-------------|--------------------|------------------|-------------------------|
| <u>Stratum "A"</u> | | | | |
| 1954 | 13,000 | 37,900 | 2,800 | 5,100 |
| 1955 | 11,600 | 29,100 | 2,100 | 7,400 |
| 1956 | 12,000 | 35,600 | 1,200 | No data |
| 1957 | 37,700 | 17,900 | 9,700 | No data |
| 1958 | 39,400 | 55,500 | 7,400 | 6,000 |
| 1959 | 14,600 | 35,100 | 200 | 2,400 |
| <u>Stratum "B"</u> | | | | |
| 1954 | 14,600 | 17,500 | 3,200 | 1,100 |
| 1955 | 11,200 | 20,200 | 0 | 1,100 |
| 1956 | 12,900 | 11,200 | 400 | No data |
| 1957 | 22,700 | 8,300 | 6,500 | No data |
| 1958 | 23,400 | 26,900 | 5,800 | 8,300 |
| 1959 | 16,500 | 33,100 | 1,100 | 8,600 |
| <u>Strata "A" and "B"</u> | | | | |
| 1954 | 27,600 | 55,400 | 6,000 | 6,200 |
| 1955 | 22,800 | 49,300 | 2,100 | 8,500 |
| 1956 | 24,900 | 46,800 | 1,600 | No data |
| 1957 | 60,400 | 26,200 | 16,200 | No data |
| 1958 | 62,800 | 82,400 | 13,200 | 14,300 |
| 1959 | 31,100 | 68,200 | 1,300 | 11,000 |

Table 10. Comparison of July Brood and Late Nesting Indices
 SOUTHERN MANITOBA, 1958 and 1959

| Species | STRATUM "A" | | STRATUM "B" | | STRATA "A" & "B" | | % Change 1958-1959 |
|-----------------------------|---------------|---------------|---------------|---------------|------------------|---------------|-----------------------|
| | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | |
| Duck Broods | 39,400 | 14,600 | 23,400 | 16,500 | 62,800 | 31,100 | - 50 |
| All Species | | | | | | | |
| <u>Late Nesting Indices</u> | | | | | | | |
| Pintail | 2,600 | 1,800 | 2,100 | 700 | 4,700 | 2,500 | |
| Mallard | 14,500 | 11,400 | 9,300 | 8,600 | 23,800 | 20,000 | |
| Baldpate | 6,500 | 2,000 | 2,100 | 1,900 | 8,600 | 3,900 | |
| Shoveler | 800 | 400 | - | - | 800 | 400 | |
| Gadwall | 700 | 500 | - | - | 700 | 500 | |
| B. W. Teal | 12,200 | 12,000 | 3,600 | 8,600 | 15,800 | 20,600 | |
| G. W. Teal | 500 | - | - | - | 500 | | |
| Scaup | 8,600 | 4,500 | 2,600 | 3,300 | 11,200 | 7,800 | |
| Canvasback | 1,700 | 200 | 2,600 | 700 | 4,300 | 900 | |
| Redhead | 2,600 | 600 | 500 | 700 | 3,100 | 1,300 | |
| Ringneck | 1,600 | 300 | - | 700 | 1,600 | 1,000 | |
| Ruddy | 2,400 | 800 | 3,100 | 5,900 | 5,500 | 6,700 | |
| Goldeneye | 400 | 100 | - | 700 | 400 | 800 | |
| Bufflehead | 300 | 500 | 500 | 1,300 | 800 | 1,800 | |
| Black Duck | - | - | 500 | - | 500 | - | |
| Scoter | 100 | - | - | - | 100 | - | |
| TOTAL | 55,500 | 35,100 | 26,900 | 33,100 | 82,400 | 68,200 | - 17 |
| Coot Broods | 7,400 | 200 | 5,800 | 1,100 | 13,200 | 1,300 | -90.2 |
| Adult Coots | 6,000 | 2,400 | 8,300 | 8,600 | 14,300 | 11,000 | -23 |
| Ponds | 163,300 | 95,500 | 341,000 | 324,500 | 504,300 | 420,000 | -17 |

Table 11. Age Class Distribution of Broods, 1954 to 1959

| Year | Stratum "A" | | | Stratum "B" | | | Strata "A" & "B" | | |
|------|--------------|---------------|----------------|--------------|---------------|----------------|------------------|---------------|----------------|
| | % in Class I | % in Class II | % in Class III | % in Class I | % in Class II | % in Class III | % in Class I | % in Class II | % in Class III |
| 1954 | 61.5 | 33.5 | 5.0 | 62.9 | 20.0 | 17.1 | 62.2 | 26.4 | 11.4 |
| 1955 | 41.9 | 30.2 | 27.9 | 17.4 | 43.5 | 39.1 | 29.9 | 36.7 | 33.4 |
| 1956 | 31.2 | 41.6 | 27.2 | 17.6 | 50.0 | 32.4 | 29.4 | 42.8 | 27.8 |
| 1957 | 29.2 | 43.2 | 27.6 | 28.1 | 56.1 | 15.8 | 29.1 | 44.4 | 26.5 |
| 1958 | 51.7 | 34.5 | 13.8 | 45.2 | 45.2 | 9.7 | 51.2 | 35.4 | 13.5 |
| 1959 | 60.4 | 32.7 | 6.8 | 63.0 | 34.8 | 2.2 | 60.8 | 33.0 | 6.2 |

Table 12. Average Size of Class II and III Broods -
SOUTHERN MANITOBA, 1954 to 1959

| <u>Year</u> | <u>Number of Broods Counted</u> | <u>Young per Class II and III Brood</u> |
|-------------|-------------------------------------|---|
| 1954 | 26 | 5.7 |
| 1955 | 28 | 5.6 |
| 1956 | No Data | 5.1 |
| 1957 | No Data | 5.6 |
| 1958 | 90 | 6.6 |
| 1959 | 69 | 5.4 |

MICHIGAN

Weather and Water Conditions

Michigan experienced one of the severest winters in the past two decades. Persistent cold weather and heavy snow were the rule over the entire State. Complete absence of the usual thaws was an uncommon feature. Weather Bureau records for January, February, and March show precipitation totals were from 1.5 inches below normal in the Upper Peninsula to 2 inches above normal in the southwestern part of the Lower Peninsula. Precipitation was mostly in the form of snow resulting in a record accumulation for several areas.

An abundant runoff of water occurred in March and April with the levels of inland lakes showing marked improvements from the lows of the previous summer. In the southern half of the Lower Peninsula inland lake levels were generally 0.1 to 0.3 feet above the 15-year median for April. Northern lakes were near record high stages. During May and June rainfall was deficient, stream flows declined, and inland lake levels dropped. The June levels were 0.2 to 0.4 feet below the 15-year median. While many ponds and swales are now dry (July), it is questionable whether this situation seriously affected duck production because of available water this spring and the numerous bodies of permanent water in Michigan.

Breeding Population Indices

The potential breeding population compared to the previous years were as follows:

| Year | Lineal miles censused | Potential breeders per lineal mile |
|------|-----------------------|------------------------------------|
| 1949 | 85.0 | 6.80 |
| 1950 | 81.0 | 7.91 |
| 1951 | 120.0 | 8.18 |
| 1952 | 82.0 | 7.13 |
| 1953 | 95.5 | 12.75 |
| 1954 | 93.5 | 12.31 |
| 1955 | 111.2 | 11.00 |
| 1956 | 110.5 | 11.48 |
| 1957 | 135.4 | 9.30 |
| 1958 | 121.0 | 15.00 |
| 1959 | 135.0 | 13.46 |

MICHIGAN - Continued

The 1959 potential breeding population, as indicated by censusing sample check areas, shows a decrease from that of last year, but is above the past 10 years' average. Semi-drought conditions and lower water levels of the Great Lakes marshes in 1958 forced some potential breeders to concentrate. This should be taken into consideration in comparing potential breeders of 1959 to those of 1958.

The species composition of the potential breeding population as determined on these sample check areas follows:

| Species | 1958 | 1959 |
|------------------|-------|-------|
| Mallard | 24.6% | 25.9% |
| Black Duck | 25.7% | 22.7% |
| Blue-winged Teal | 21.0% | 32.8% |
| Wood Duck | 3.3% | 4.8% |
| Ring-necked Duck | 11.8% | 5.6% |
| Merganser | 2.8% | 0.7% |
| Goldeneye | 1.5% | 1.0% |
| Unidentified | 9.3% | 6.5% |

Breeding population changes for wood duck as determined by float-trip censuses follow:

| Year | Float Trips | |
|------|-----------------------|--|
| | Lineal miles censused | Potential wood duck breeders per lineal mile |
| 1950 | 81.0 | .17 |
| 1951 | 120.0 | .32 |
| 1952 | 82.0 | .21 |
| 1953 | 95.5 | .85 |
| 1954 | 93.5 | .58 |
| 1955 | 111.2 | .70 |
| 1956 | 110.5 | .28 |
| 1957 | 135.4 | .46 |
| 1958 | 121.0 | .33 |
| 1959 | 135.0 | .65 |

MICHIGAN - Continued

The number of potential nesting wood ducks seen per lineal mile of census route was higher than in the previous 3 years and above the 10-year average. Higher counts were recorded only for 1953 and 1955. Wood ducks made up 4.8 percent of all nesting species. This is comparable to the 10-year average.

Production Indices

The brood survey comparisons follow:

| Year | Broods per lineal mile | Hens and young per lineal mile | Bachelor ducks per lineal mile | Average size of broods observed |
|------|------------------------|--------------------------------|--------------------------------|---------------------------------|
| 1949 | .47 | 2.75 | 6.50 | 6.00 |
| 1950 | .34 | 2.32 | 5.50 | 5.87 |
| 1951 | .35 | 2.20 | 3.31 | 5.76 |
| 1952 | .70 | 3.92 | 3.21 | 4.60 |
| 1953 | .51 | 3.63 | 4.32 | 6.10 |
| 1954 | .20 | 1.67 | 4.60 | 6.24 |
| 1955 | .64 | 4.65 | 5.09 | 6.28 |
| 1956 | .53 | 3.67 | 4.40 | 5.86 |
| 1957 | .38 | 2.30 | 4.80 | 5.10 |
| 1958 | .31 | 2.18 | 6.50 | 5.97 |
| 1959 | .66 | 4.00 | 12.58 | 5.06 |

The average number of broods seen per lineal mile exceeded the figure for any of the preceding years except 1952. The average size of the broods remained equal to the past 10-year average. The number of bachelor birds, however, was the highest on record.

Conclusions

Judging from both surveys, waterfowl production for 1959 in Michigan approximated the 10-year average and differed very little from that of last year. Any change that might be indicated would tend toward a slight improvement over last year's production.

OHIO

Weather and Water Conditions

Both weather and water conditions could be considered as ideal for the production of wood duck in Ohio during the spring and summer of 1959.

Breeding Population Indices

Ohio waterfowl breeding grounds surveys during 1959 were primarily aimed at obtaining an index to wood duck production in this State.

Two methods were used to determine production of species. These included the conventional float-trip censuses on 100 linear miles of streams and the wood duck nest-box checks.

Each portion of the streams that were surveyed were floated three times. These surveys were conducted during mid-May, June and July.

The wood duck nest boxes were checked during the last two weeks in June.

There was an average of .40 broods of wood ducks observed per linear mile of stream surveyed during 1959. This represents about an 18 percent increase over the 4-year average of .34 broods per linear mile of stream surveyed (Table 1).

Table 1 - Wood Duck Broods Observed on Streams
In Ohio

| <u>Year</u> | <u>Broods Per Lineal Mile</u> |
|-------------|-----------------------------------|
| 1954 | .30 |
| 1955 | .34 |
| 1956 | .38 |
| 1957 | .34 |
| 1958* | - |
| 1959 | .40 |

* None taken during 1958 due to high waters.

There were 1,534 wood duck nest-boxes checked in Ohio during 1959. Of this number only 1,244 were in useable condition.

OHIO - Continued

Conclusions

On the basis of the stream surveys and wood duck nest-box checks it appears there will be a fairly substantial increase over the previous year in the wood duck production in Ohio.

OHIO - Continued

Three hundred and sixty-four (29.26%) were utilized by Wood ducks for nesting (Table 2). This is an increase of about 24 percent over the previous year when the degree of utilization was 23.54 percent.

Table 2. Ohio Wood Duck Nest Box Checks - 1959

| Area | Number Checked | | Number Useable | | Number Used | | Percent Used | | Percent Change |
|-------------------|----------------|-------|----------------|-------|-------------|------|--------------|-------|----------------|
| | 1959 | 1958 | 1959 | 1958 | 1959 | 1958 | 1959 | 1958 | |
| Lake Erie Marshes | 164 | 148 | 149 | 147 | 36 | 28 | 24.16 | 19.05 | + 26.82 |
| Northwest | 250 | 106 | 225 | 93 | 75 | 34 | 33.33 | 36.56 | - 10.04 |
| Northeast | 130 | 175 | 95 | 141 | 31 | 38 | 32.63 | 26.95 | + 21.08 |
| Southeast | 265 | 264 | 206 | 205 | 21 | 24 | 10.19 | 11.71 | - 12.98 |
| South Central | 309 | 274 | 256 | 236 | 100 | 73 | 39.06 | 30.93 | + 26.29 |
| Southwest | 416 | 261 | 313 | 202 | 101 | 44 | 32.27 | 21.78 | + 48.16 |
| State Totals | 1,534 | 1,228 | 1,244 | 1,024 | 364 | 241 | 29.26 | 23.54 | + 24.30 |

IOWA

Weather and Water Conditions

In 1959, with the exception of northwestern Iowa, this State had recovered from temporary drought. Heavy rains during May throughout the entire State improved and created much additional nesting habitat. Unoccupied dry areas in northwest Iowa, which were filled or partially filled by heavy rains in May were immediately occupied by nesting ducks, especially blue-winged teal. Habitat conditions remain excellent throughout most of Iowa indicating better than average production and survival of young waterfowl.

Breeding Population and Production Data

Unusually large numbers of nesting blue-winged teal and mallard have been reported in Iowa in 1959. Habitat which has been sparsely occupied by nesting ducks during the last decade in southwestern, southcentral, and in east and northcentral Iowa is much more productive this year. Many brands have already been reported from these areas.

Limited information from stream surveys indicate the wood duck population trend in Iowa is slightly upward. Habitat conditions and broods reported to date suggest better than average production and survival of this species.

Conclusions

It is anticipated that the fall flight of ducks from Iowa this year will be somewhat larger than in 1958.

INDIANA

Breeding Population Indices

Three stream sections (Maumee, Mississinewa, and Muscatatuck) totaling 47 stream miles were covered between April 24 and May 9 as has been done in the years 1952 through 1959, except for the one year, 1954. Eighty-one males and 63 female wood ducks were observed this year. Observed males were 3.6 percent below the figure for 1958, but 32 percent above the previous six-year average. Observed females were 70 percent above those of 1958, and 146 percent above the average. No wood duck broods were observed on the preliminary survey for the second year in succession.

Production Indices

Nine stream sections (Maumee, Elkhart, Big Blue, West Fork of the White, Salt, Iroquois, Eel and Muscatatuck) totaling 143 stream miles have been covered yearly between May 22 and June 30 since 1950. A total of 116 wood duck broods was observed this year (Table 1). This brood count is seven percent above that of 1958, and 36 percent above the previous six-year average. Conditions for brood counts were considered good on all except the Muscatatuck section, where heavy torrential rains kept the study leader and assistant from starting count at sunrise. This section was covered that day, May 26, starting approximately at 9:30 a.m. Thirty-five broods were observed on this coverage and the validity of the float doubted when compared to the 46 brood figure for 1958 and average figure of 27.3. A second coverage was made on this section on June 6 and at that time 38 broods were observed. One group of 16 wood duck ducklings observed each time in approximately the same location was determined to be two broods instead of one as first thought. No females were observed with this group on first sighting, but two were seen accompanying broods on second trip.

Whole counts were recorded on 80 of the 116 broods. Brood size averaged 8.5, and ranged from one to 16 (Figure 1). Brood age distribution for the 116 broods indicates timing of surveys was fair to good, with a slight leaning to the younger age groups.

Conclusions

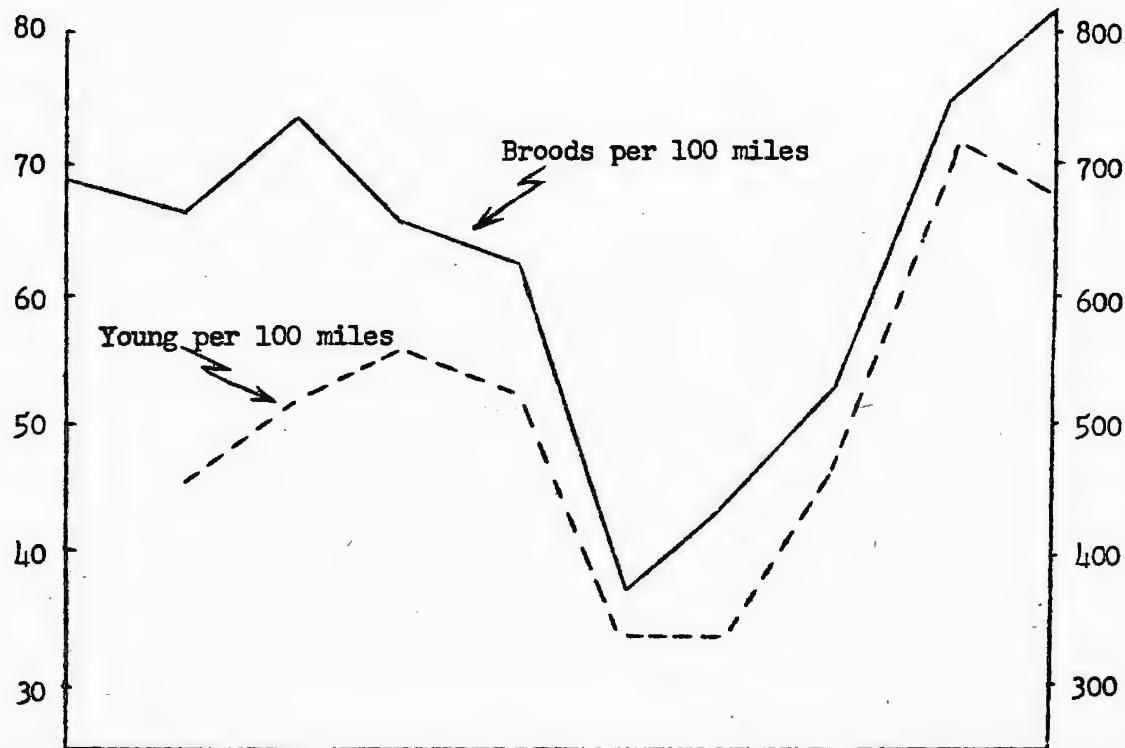
All conditions indicate another successful reproductive season for the wood duck in Indiana. Low water levels which prevailed on all counts again, as in 1958, undoubtedly created conditions for abnormally complete counts, and results of field work should be considered from that viewpoint.

For the fourth successive year there has been an increase in the wood duck brood count index, since the low of 1955.

Table 1. Wood Duck Broods Observed, By Stream Section and By Age Class,
Indiana 1959, Compared to 1958 and 1952-58 Average

| Stream Section | Miles | Date | Number of Broods By Age Class | | | | | | Total 1959 | Total 1958 | 1952-58 Average |
|-------------------------------------|-------|---------|----------------------------------|--------|--------|---------|---------|---------|---------------|---------------|--------------------|
| | | | I A | I B | I C | II A | II B | II C | | | |
| Maumee | 15 | 6/11/59 | 0 | 1 | 7 | 2 | 0 | 0 | 10 | 11 | 6.8 |
| Elkhart | 17 | 6/10/59 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 3 | 3.3 |
| Iroquois | 14 | 6/9/59 | 0 | 1 | 1 | 1 | 0 | 0 | 3 | 1 | 3.6 |
| Mississinewa | 13 | 6/4/59 | 0 | 3 | 2 | 0 | 0 | 0 | 5 | 4 | 6.3 |
| Big Blue | 12 | 6/2/59 | 0 | 2 | 3 | 2 | 0 | 0 | 7 | 6 | 7.6 |
| W. F. White | 25 | 6/3/59 | 0 | 2 | 7 | 2 | 2 | 0 | 13 | 14 | 15.1 |
| Muscatatuck | 19 | 6/5/59 | 0 | 6 | 23 | 9 | 0 | 0 | 38 | 46 | 27.3 |
| Salt Creek | 15 | 5/27/59 | 0 | 4 | 8 | 3 | 1 | 0 | 16 | 12 | 7.5 |
| Eel River | 13 | 5/28/59 | 1 | 7 | 13 | 1 | 0 | 0 | 22 | 11 | 8.0 |
| TOTALS | 143 | | 1 | 27 | 64 | 21 | 3 | 0 | 116 | 108 | 85.5 |
| Percent Change From 1958 | | | | | | | | | | | +77.4 |
| Percent Change From 1952-58 Average | | | | | | | | | | | +35.7 |

FIGURE 1

WOOD DUCK BROODS AND YOUNG PER 100 MILES OF
STREAM SECTIONS, INDIANA 1950 THROUGH 1959

| Year | Broods Per 100 Miles | Average Brood Size /1 | Young Per 100 Miles |
|------|----------------------|-----------------------|---------------------|
| 1950 | 59.2 | - | - |
| 1951 | 64.2 | 7.1 | 456 |
| 1952 | 72.3 | 7.1 | 513 |
| 1953 | 63.6 | 8.8 | 560 |
| 1954 | 62.6 | 8.3 | 516 |
| 1955 | 39.2 | 8.6 | 337 |
| 1956 | 46.2 | 7.3 | 337 |
| 1957 | 52.5 | 8.9 | 467 |
| 1958 | 75.5 | 9.6 | 725 |
| 1959 | 81.1 | 8.5 | 689 |

/1 Average brood size determined from whole broods only.

MISSOURI

Breeding Population and Production Data

Lake, marsh, and stream nesting surveys were made by Conservation Agents, Federal-Aid Biologists, and area managers during the period of June 1 to June 30, 1959. A total of 7,884 acres of lake and marsh and 583 miles of streams were censused. An upward trend in the nesting efforts of wood ducks has occurred since 1956. Nesting efforts per mile of stream for wood ducks increased from .15 during the 1958 census to .22 this spring. This approximates nearly a nesting effort for every four miles of stream censused and parallels the .24 nesting efforts of 1953 and the .22 efforts in 1954.

The average increase in wood duck nesting efforts per mile of stream over 1958 was 47 percent. Nesting efforts for lake and marsh areas dropped by 15 percent.

Wood duck brood observations per mile of stream also increased significantly from .06 to .13. This is the highest number of brood observations since 1952. The average number of young per age class decreased from 9.0 to 7.0 in Class I or a 22 percent decrease, Class II from 6.3 to 5.0 or a 21 percent drop, Class III from 7.5 to 4.0 or 47 percent decrease.

Nesting success of mallards and blue-winged teal returned to the 1955 low of 2.5 nesting efforts per square mile of lake and marsh. We did experience a 25 percent increase in nesting efforts per mile of stream, but even with the increase, nesting mallards and blue-wing production within the State of Missouri add very little to the flyway.

Tables 1, 2, and 3 show nesting efforts and trends of wood ducks, mallards and blue-winged teal since 1953.

Conclusions

It is estimated that there will be a small increase in the fall flight of wood duck from Missouri as compared to 1957, but the flight of mallard and blue-winged teal will be about the same.

Table 1. Nesting Efforts of Wood Duck, Mallard, Blue-Winged Teal, Pintail, Shoveler -
1959 Waterfowl Nesting Survey - South and North Missouri

| Species | Lone Drake | Lone Hen | Pairs | No. | Total Young | Avg. Young Per Brood | Total Nesting Effort | Nesting Effort Per Square Mi. |
|----------------------------|------------|----------|-------|-----|-------------|----------------------|----------------------|-----------------------------------|
| 7784 Acres of Lake - Marsh | | | | | | | | |
| Wood Ducks | 17 | 10 | 15 | 19 | 135 | 7.10 | 61 | 5.0 |
| Mallards | 12 | 3 | 7 | 4 | 34 | 8.50 | 26 | 2.1 |
| Blue-winged Teal | 2 | 1 | | 1 | 2 | | | |
| Pintail | 1 | | | 1 | | | | |
| Shoveler | | | | 1 | | | | |
| Ruddy | | | | 1 | | | | |
| <hr/> | | | | | | | | |
| Lake and Marsh Totals | 32 | 14 | 25 | 24 | 171 | 7.80 | 87 | 7.1 |
| <hr/> | | | | | | | | |
| Species | Lone Drake | Lone Hen | Pairs | No. | Total Young | Avg. Young Per Brood | Total Nesting Effort | Nesting Effort Per Mile of Stream |
| 583 Miles of Stream | | | | | | | | |
| Wood Ducks | 20 | 16 | 16 | 78 | 432 | 5.53 | 130 | .22 |
| Mallards | 6 | 1 | 5 | 4 | 25 | 6.25 | 16 | .03 |
| Blue-winged Teal | 3 | 1 | | 1 | 3 | | | |
| Pintail | | | | 1 | | | | |
| <hr/> | | | | | | | | |
| Stream Totals | 29 | 18 | 22 | 83 | 460 | 5.89 | 146 | .25 |
| <hr/> | | | | | | | | |
| GRAND TOTAL | 61 | 32 | 47 | 107 | 631 | 6.8 | 233 | |
| <hr/> | | | | | | | | |

Table 2. Trend Data - Wood Duck Nesting Survey - 1953-1959 - Missouri

| | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | Percent Change |
|--------------------------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
| Acres of lake and marsh censused | 4,976 | 4,931 | 7,110 | 2,222 | 5,897 | 6,871 | 7,884 | / 15.0 |
| Miles of stream censused | 371 | 581 | 666 | 564 | 774 | 613 | 583 | - 5.0 |
| Nesting effort per sq. mi. of | | | | | | | | |
| Lake and marsh | 5.8 | 4.4 | 3.6 | 3.1 | 3.8 | 5.9 | 5.0 | - 15.0 |
| Nesting effort per mile of stream | .24 | .22 | .13 | .10 | .13 | .15 | .22 | / 47.0 |
| Number of broods (stream) | 42 | 31 | 28 | 23 | 37 | 37 | 78 | / 111.0 |
| Broods per mile of stream | .09 | .04 | .03 | .04 | .04 | .06 | .13 | / 117.0 |
| Average number of ducklings, Class I | 4.9 | 5.8 | 7.3 | 6.3 | 7.0 | 9.0 | 7.0 | - 22.0 |
| " " " " Class II | 4.4 | 7.2 | 6.2 | 5.8 | 6.0 | 6.3 | 5.0 | - 21.0 |
| " " " " Class III | 4.6 | - | - | 7.0 | 6.1 | 7.5 | 4.0 | - 47.0 |
| " " " " All Classes | 4.5 | 6.5 | 6.7 | 6.4 | 6.1 | 7.6 | 5.6 | - 26.0 |

Table 3. Trend Data - Mallard and Blue-winged Teal Nesting Survey - 1953-1959

| | 1953 | 1954 | 1955 | 1956 | 1957 | 1958 | 1959 | Percent Change |
|-----------------------------------|-------|-------|-------|-------|-------|-------|-------|----------------|
| Acres of lake and marsh | 4,976 | 4,931 | 7,110 | 2,222 | 5,897 | 6,871 | 7,884 | / 15.0 |
| Miles of stream censused | 371 | 581 | 666 | 564 | 774 | 613 | 583 | - 5.0 |
| Nesting effort per sq. mi. of | | | | | | | | |
| Lake and marsh | 4.0 | 2.7 | 2.5 | - | 6.5 | 3.0 | 2.5 | - 17.0 |
| Nesting effort per mile of stream | .19 | .12 | .03 | - | .07 | .04 | .05 | / 25.0 |

Atlantic Flyway Data

Waterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1947-58 and 1958-59 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

| Species | 1958-59 | 1957-58 | Percent Change |
|---------------------------|-----------|-----------|-----------------------|
| | | | 1957-58 to 1958-59 |
| Black Duck | 268,081 | 288,311 | - 7.02 |
| Mallard | 247,463 | 262,220 | - 5.63 |
| Canvasback | 64,811 | 72,888 | - 11.08 |
| Wood Duck | 110,471 | 74,853 | + 47.58 |
| Scaup | 108,289 | 107,972 | + .29 N.C. |
| G. W. Teal | 42,703 | 60,096 | - 28.94 |
| B. W. Teal | 32,734 | 39,860 | - 17.88 |
| American Wigeon | 42,643 | 77,117 | - 44.70 |
| Pintail | 80,862 | 58,833 | + 38.62 |
| Goldeneye | 22,836 | 35,852 | - 36.30 |
| Redhead | 16,516 | 28,226 | - 41.49 |
| Merganser | 28,727 | 43,959 | - 34.65 |
| Ring-necked | 35,702 | 31,740 | + 12.61 |
| Scoter | 31,565 | 35,709 | + 11.61 |
| Ruddy | 10,005 | 16,722 | - 40.17 |
| Bufflehead | 36,311 | 38,064 | - 4.61 |
| Shoveler | 6,105 | 11,452 | - 46.69 |
| Gadwall | 3,577 | 11,998 | - 70.19 |
| Others* | 3,077 | 5,466 | - 43.71 |
| Total Ducks Retrieved | 1,192,478 | 1,301,338 | - 8.37 |
| Total Ducks not Retrieved | 294,948 | 288,708 | + 2.16 |
| Total Duck Kill | 1,487,426 | 1,590,046 | - 6.45 |
| Canada Goose | 59,875 | 98,365 | - 39.13 |
| Brant Goose | 12,963 | 16,355 | - 20.74 |
| Other Geese | 662 | 792 | - 16.42 |
| Total Geese Retrieved | 73,500 | 115,513 | - 36.37 |
| Total Geese not Retrieved | 10,330 | 15,444 | - 33.11 |
| Total Goose Kill | 83,830 | 130,952 | - 35.99 |
| Total Coots Retrieved | 61,545 | 97,313 | - 36.76 |
| Total Coots not Retrieved | 23,800 | 26,280 | - 9.44 |
| Total Coot Kill | 85,345 | 123,593 | - 30.95 |

* Mostly Old-Squaw and Eider

Atlantic Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill and Daily Bag as Determined by the Waterfowl Hunter Mail Survey.

| | | | Percent Change |
|---|----------------|----------------|-----------------------|
| | 1958-59 | 1957-58 | 1957-58 to 1958-59 |
| Number of Potential Hunters | | | |
| 16 and over* | 316,664 | 357,130 | - 11.33 |
| Under 16 | 20,288 | 19,212 | + 5.60 |
| Total | 336,952 | 376,342 | - 10.47 |
| Number of Active Hunters** | | | |
| 16 and over | 270,676 | 299,618 | - 9.66 |
| Under 16 | 15,267 | 13,844 | + 10.28 |
| Total | 285,943 | 313,012 | - 8.65 |
| Average Times Hunted** | | | |
| | 3.523 | 4.157 | - 15.25 |
| Average Seasonal Bag** | | | |
| <u>16 and over</u> | Ducks | 4.306 | 4.263 |
| | Geese | .262 | .378 |
| | Coots | .211 | .313 |
| <u>Under 16</u> | Ducks | 1.762 | 1.746 |
| | Geese | .164 | .172 |
| | Coots | .293 | .251 |
| Average seasonal No. not Retrieved** | | | |
| <u>16 and over</u> | Ducks | 1.057 | 0.937 |
| | Geese | .037 | .049 |
| | Coots | .081 | .082 |
| <u>Under 16</u> | Ducks | .576 | .579 |
| | Geese | .022 | .053 |
| | Coots | .128 | .120 |
| Average Daily Bag** | | | |
| <u>16 and over</u> | Ducks | 1.222 | 1.025 |
| | Geese | .074 | .091 |
| | Coots | .060 | .073 |
| <u>Under 16</u> | Ducks | .500 | .420 |
| | Geese | .046 | .041 |
| | Coots | .083 | .060 |

* Individuals who purchased a Duck Stamp with intent to hunt.

** Individuals who hunted at least once.

Winter Trend Data - Atlantic Flyway

Reports from the winter survey crews in the Atlantic Flyway indicate that during this year's survey it was likely that a higher percentage of the birds present were observed than was true last year. This was due in part to frozen habitat in the northern part of the Flyway and to drier conditions in the southern part, both of which force birds out into the open where they could be more readily seen. Practically all of the survey was conducted during the period January 16 through 21.

The results of the survey shows the status of the overall population of important species of ducks to be similar to that of last year. This leaves little room for optimism since last year's survey indicated a population level at or below the lowest of the past 10 years. It should be kept in mind also that since birds were more readily observed this year, the net effect could be a lower population status than that of last year.

There were rather sizeable increases in the status of some species as compared to last year, such as the mallard (plus 76 percent), gadwall (plus 87 percent) and shoveller (plus 72 percent). It is perhaps significant to note that these increases occurred primarily in South Carolina where lower water levels made the birds more visible. Last year, the mallard population dropped about 50 percent due possibly to high water levels which caused the birds to move into areas where they were not readily seen. In fact it is interesting to note that the total dabbling duck estimate for South Carolina is in the neighborhood of 4 times that of the next highest State. This is quite unusual and is thought to be attributable not only to lower water levels but also to the forcing of birds south by severe winter weather in the northern part of the Flyway.

Among the diving ducks there were small to moderate decreases in all species except ring-neck and bufflehead. The population of ringneck has decreased markedly during the past several years, and it is encouraging to note that the wintering population in the Atlantic Flyway increased approximately one-third during 1959.

The Canada goose population remained approximately stable as compared to a year ago. It should be noted, however, that there has been a gradual decrease in the Canada goose population in the Atlantic Flyway from a peak reached in 1955. The 1959 wintering population was 41 percent below the 1955 level. The

greater snow goose population in the Atlantic Flyway has decreased during the past several years also, although not to the same degree. Snow geese reached a peak population in 1954, and the 1959 wintering index stands 27 percent below this level.

The Whistling swan population remains unchanged as compared to 1958 but again the population index represents a considerable decrease (minus 69 percent) from a peak population reached in 1955.

A small increase was recorded in the wintering population of American brant. The population trend of this species has been generally upward during the last 11 years and is in good condition.

A small decrease in the wintering populations of coot was recorded. The population trend in this species seems to have been generally downward during the past 11 years.

Percent Change from 1958 to 1959 in Duck, Goose, Brant, Swan and Coot Populations - Atlantic Flyway (Comparable Coverage)

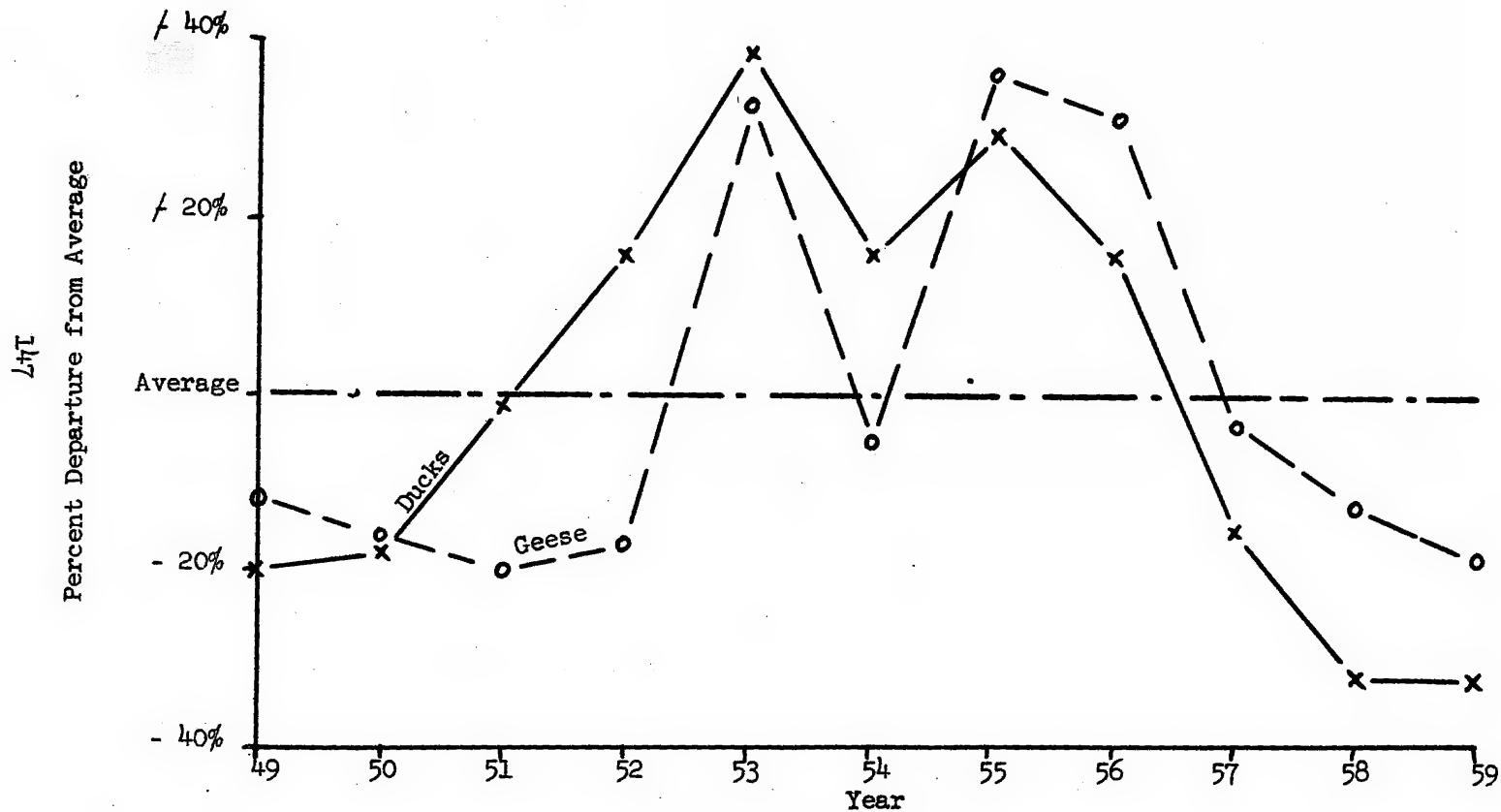
| Area | Ducks | Geese | Brant | Swan | Coot | Total |
|------------------------|--------------|--------------|--------------|--------------|---------------|--------------|
| Canada | + 29.0 | + 5.2 | - | - | - | + 25.2 |
| Atlantic Flyway States | - 0.1 | - 7.8 | + 3.0 | - 0.4 | - 21.1 | - 3.3 |
| TOTAL | + 0.3 | - 7.5 | + 3.0 | - 0.4 | - 21.1 | - 3.0 |

Species Composition - Atlantic Flyway - 1958 and 1959
 (Comparable Coverage)

| Species | Percent of Birds 1958 | Identified 1959 | Percent Change |
|-----------------------|--------------------------|--------------------|-------------------|
| <u>Dabbling Ducks</u> | | | |
| Black Duck | 9.0 | 10.6 | + 13.1 |
| Pintail | 5.7 | 6.2 | + 4.5 |
| Mallard | 5.4 | 9.8 | + 76.0 |
| Baldpate | 3.8 | 3.0 | - 22.2 |
| G. W. Teal | 1.7 | 1.6 | - 9.9 |
| Gadwall | 1.0 | 1.9 | + 87.2 |
| Wood Duck | .4 | .6 | + 51.6 |
| Shoveler | .4 | .7 | + 72.1 |
| B. W. Teal | .3 | .4 | + 2.9 |
| <u>Sub-Total</u> | 27.7 | 34.8 | + 21.3 |
| <u>Diving Ducks</u> | | | |
| Scaup | 18.7 | 18.6 | - 4.3 |
| Redhead | 4.0 | 3.3 | - 19.8 |
| Ruddy | 3.6 | 1.3 | - 63.7 |
| Canvasback | 3.2 | 3.0 | - 8.7 |
| Goldeneye | 2.4 | 1.9 | - 22.4 |
| Ringneck | 2.2 | 3.0 | + 33.1 |
| Bufflehead | .7 | .9 | + 12.6 |
| <u>Sub-Total</u> | 34.8 | 32.0 | - 11.2 |
| <u>Misc. Ducks</u> | | | |
| Scoter & Eider | 4.2 | 1.8 | - 58.3 |
| Merganser | 1.7 | 2.0 | + 13.4 |
| Old Squaw | .3 | .2 | - 47.2 |
| <u>Sub-Total</u> | 6.2 | 4.0 | - 38.2 |
| <u>Geese</u> | | | |
| Canada Goose | 10.1 | 9.8 | - 5.9 |
| Snow Goose | 1.5 | 1.2 | - 19.0 |
| Blue Goose | Tr. | Tr. | - 21.3 |
| <u>Sub-Total</u> | 11.6 | 11.0 | - 7.4 |
| Whistling Swan | .9 | .9 | - 0.4 |
| American Brant | 6.6 | 7.1 | + 3.0 |
| Coot | 12.2 | 10.0 | - 21.1 |
| <u>GRAND TOTAL</u> | 100.0 | 99.8 | - 3.0 |

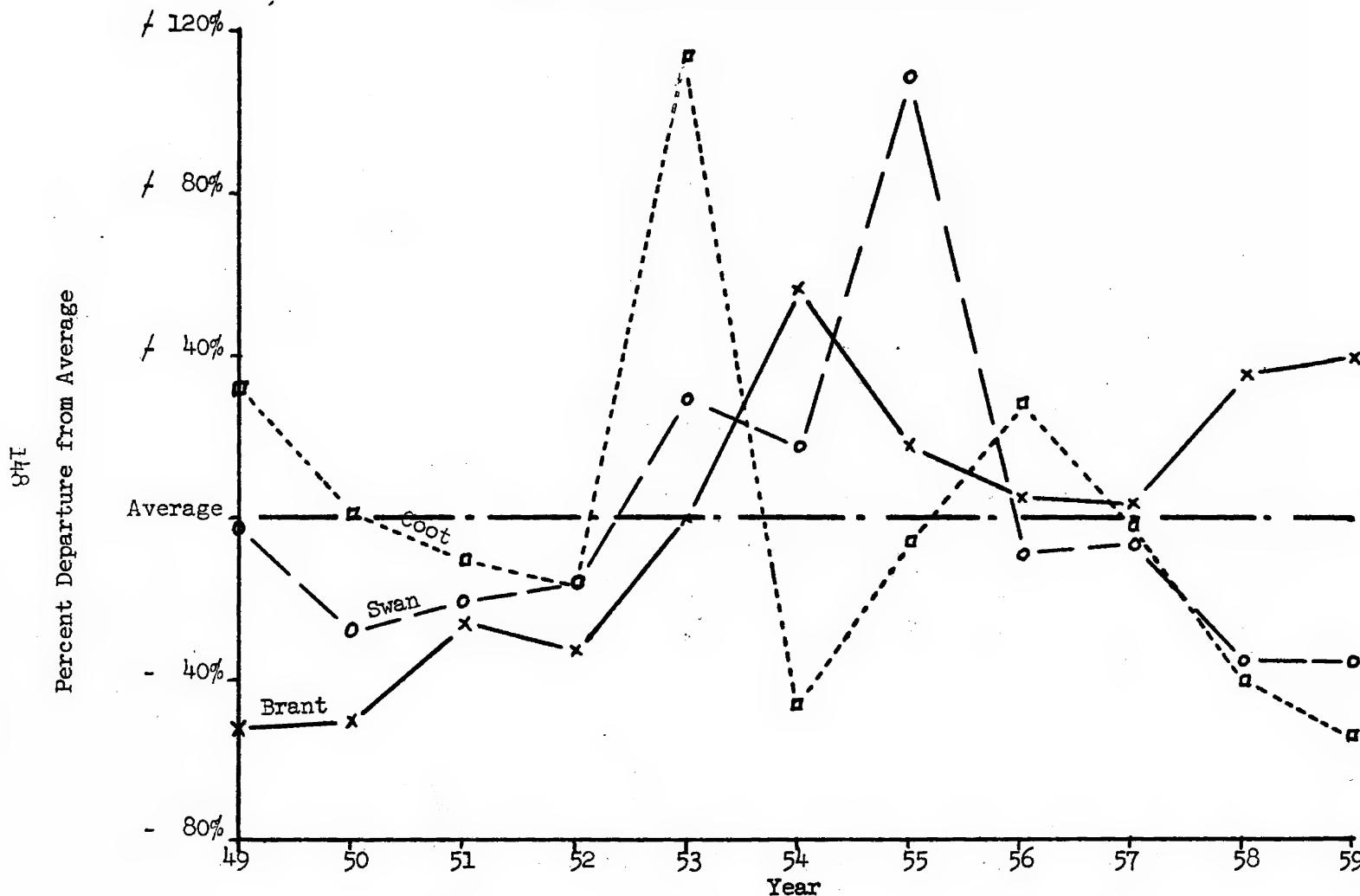
Trend in Duck and Goose Populations - Atlantic Flyway

1949 through 1959 (Comparable Coverage)



Trend in Brant, Swan and Coot Populations - Atlantic Flyway

1949 through 1959 (Comparable Coverage)



MARITIME PROVINCES

Weather and Water Conditions

Dry and warm weather prevailed in the Maritime Provinces during April and May and water levels in streams and ponds were much below normal. However, June was a particularly cold and wet month with precipitation excesses of 50 to 75 percent being fairly general throughout the Maritimes. Water levels were considerably above normal on June 20th following two weeks of heavy and almost continuous rainfall. Rises of 2 to 3 feet in water levels occurred in some coastal ponds following heavy winds and rainfall in the Gulf of St. Lawrence on July 19th and 20th.

Nesting and rearing conditions, therefore, were very favorable for the black duck but considerably less favorable for the later-nesting teals and the ring-necked duck. The dry period followed by a relatively rapid rise in water levels at a time when a great many teal and ring-necks were incubating, no doubt resulted in some nest losses from flooding.

Breeding Population Indices

Total game ducks observed on ground and aerial surveys this spring increased approximately 13 percent from 1958 (Table 1). Only one species, the ring-necked duck was down in numbers with a drop of 32 percent from last year. Counts of black duck and golden-eye suggested a slight increase in breeding population; large increases were recorded for the two teals and pintail.

The increase in blue-winged teal and the decrease in ring-necked duck breeding populations was very apparent during field surveys, particularly on the aerial and ground surveys of Prince Edward Island. Blue-winged teal were numerous and ring-necks were absent from many of the small ponds that last year supported good ring-neck breeding populations. Larger than the usual number of pintails were observed in the Saint John River valley and in the Hillsborough River estuary of Prince Edward Island. Increases in the American widgeon breeding population in Nova Scotia and Prince Edward Island were evident from both the breeding-pair and the summer brood surveys.

Production Indices

(a) Black Duck

Although slightly more black ducks were observed on the breeding-pair inventory in May of this year (Table 1) fewer broods

and young birds were observed on both the aerial and ground surveys carried out in June and July (Table 2). Table 3 shows a decrease in average brood size for all three age classes.

(b) Ring-necked Duck

Counts of ring-necked duck in May of this year were down 32 percent from 1958 (Table 1). A 50 percent decrease also occurred in the number of adult and young birds observed on summer brood surveys (Table 2). Average brood sizes were also smaller in 1959.

(c) Goldeneye

Although there was only a slight increase in the number of goldeneye observed on the breeding-pair survey in May, the number of broods and young birds observed on the summer brood surveys increased approximately 50 percent from 1958 (Table 2).

The average size of class II broods observed was 5.4 as compared to 3.1 in 1958 (Table 3).

(d) Blue-winged Teal

A large increase from 1959 occurred in the number of adult birds observed on both the breeding-pair and summer brood surveys. The increase in the number of broods observed (Table 2) indicates that many nests survived the flood conditions that prevailed in mid-June.

Conclusions

Available data suggest slight decrease in Black Duck and a large decrease in Ring-necked Duck production in 1959. Production of Goldeneye and Blue-winged teal will probably be greater than 1958 production.

Table 1. Spring waterfowl inventory, Maritime Provinces, 1958
and 1959 (Comparable date for principal breeding species)

| Type of Survey | Year | Species | | | | | |
|----------------------|------|---------------|------------------|----------------|--------------|--------------|---------|
| | | Black Duck | Ringneck Duck | Golden- Eye | B.W. Teal | G.W. Teal | Pintail |
| Aerial | 1958 | 2,123 | 456 | 185 | 63 | 30 | 26 |
| | 1959 | 2,705 | 308 | 132 | 139 | 39 | 42 |
| Ground | 1958 | 814 | 209 | 140 | 61 | 13 | 41 |
| | 1959 | 657 | 141 | 220 | 76 | 73 | 163 |
| Total | 1958 | 2,937 | 665 | 325 | 124 | 43 | 67 |
| | 1959 | 3,362 | 449 | 352 | 215 | 112 | 205 |
| Percentage Change | | +14 | -32 | +8 | + | + | + |

Table 2. Summer brood survey, Maritime Provinces, 1958 and 1959 (Comparable data for principal breeding species)

| Type of Survey | Year | Black Duck | | | Ringneck | | | Goldeneye | | | B. W. Teal | | |
|----------------------|------|------------|-----|-----|----------|-----|-----|-----------|-----|-----|------------|-----|-----|
| | | Ad. | Br. | Yg. | Ad. | Br. | Yg. | Ad. | Br. | Yg. | Ad. | Br. | Yg. |
| Ground | 1958 | 116 | 48 | 364 | 95 | 10 | 86 | 77 | 16 | 77 | 65 | 8 | 75 |
| | 1959 | 205 | 37 | 233 | 60 | 5 | 40 | 77 | 20 | 130 | 70 | 16 | 135 |
| Aerial (P.E.I.) | 1958 | 385 | 46 | 322 | 104 | 1 | 4 | | | | 55 | | |
| | 1959 | 352 | 43 | 305 | 79 | | | | | | 90 | 5 | 39 |

Table 3. Average brood sizes by age classes, 1958 and 1959

| Species and Year | Class I | | Class II | | Class III | | Total Broods |
|-------------------------|------------------|--------------|------------------|--------------|------------------|--------------|-----------------|
| | No. of Broods | Ave. Size | No. of Broods | Ave. Size | No. of Broods | Ave. Size | |
| <u>Black Duck</u> | | | | | | | |
| 1958 | 18 | 8.2 | 49 | 7.5 | 31 | 6.7 | 98 |
| 1959 | 22 | 7.7 | 40 | 6.8 | 27 | 6.3 | 89 |
| <u>Ring-necked Duck</u> | | | | | | | |
| 1958 | 10 | 9.1 | 3 | 10.0 | | | 13 |
| 1959 | 9 | 7.7 | 4 | 8.5 | | | 13 |
| <u>Goldeneye</u> | | | | | | | |
| 1958 | 8 | 6.5 | 8 | 3.1 | | | 16 |
| 1959 | 9 | 5.8 | 5 | 5.4 | | | 14 |
| <u>Blue-winged Teal</u> | | | | | | | |
| 1958 | 7 | 9.7 | 6 | 10.3 | | | 13 |
| 1959 | 27 | 9.0 | 10 | 9.2 | | | 37 |

NORTHEASTERN STATES

Weather and Water Conditions

The production season conditions in Maine, Vermont, New Hampshire and Northern New York were spotty and irregular. The spring breakup was later than usual. In general May had above-normal temperatures and below-normal precipitation; middle June in contrast was cool with abnormally high precipitation and flooding in some areas. July precipitation was approximately normal. In general, water levels were above normal and temperatures below normal for the area.

In the states of Massachusetts, Connecticut and Rhode Island the weather up to July was wet and cold with cloudy conditions prevailing which resulted in higher water levels and retarded vegetation. Massachusetts had the wettest June since 1880.

Southern New York, New Jersey and Delaware - the spring was slightly later this year with excessive rainfall along the coast in May and June resulting in higher water levels and retarding of vegetation. High tides along the coast inundated many nesting areas.

In West Virginia the season was reported as normal throughout most of the State with fair to good nesting conditions.

Brood production conditions are reported as improved over 1958 and were considered good. High water levels increased border cover available.

Breeding Population Indices

The breeding population showed no significant change this year with the exception of blue-winged teal which showed a substantial increase.

Production Indices

The results of the production surveys are presented in Tables 1 and 2. In Table 1 the 118 areas which were given comparable coverage in 1958 and 1959 are divided on the basis of the number showing an increase in production, those showing no change, and those showing a decrease. The number showing a decrease (59) somewhat exceeded the number on which production increased (50), although many of the areas where a decrease occurred recorded only a small reduction.

NORTHEASTERN STATES - Continued

In Table 2 data from the 118 comparable areas are summarized in terms of number of broods and young by species. On this basis, increases in production were indicated for all species except ringneck ducks. The average brood size remained about the same as in 1958.

Conclusions

It is estimated that with the exception of mallards and blue-winged teal, which are relatively unimportant in the northeast, that the fall flight of ducks will be about the same as last year.

Table 1. Number of Comparable Areas by States Showing Status of Production

| State | Comparable Areas | Increase | No Change | Decrease |
|---------------|-----------------------------------|----------|-----------|----------|
| Connecticut | 17 (2 new areas established) | 9 | 2 | 6 |
| Delaware | 2 | 1 | - | 1 |
| Maine | 45 (32 new areas established) | 18 | 3* | 24 |
| Massachusetts | 4 | 3 | - | 1 |
| New Hampshire | 3 | 2 | - | 1 |
| New Jersey | 10 | 3 | 2 | 5 |
| New York | 7 | 2 | 1 | 4 |
| Rhode Island | 17 | 7 | - | 10 |
| Vermont | 7 | 3 | 1 | 3 |
| West Virginia | 6 (3 new areas established) | 2 | - | 4 |
| Total | 118 (37 new areas established) | 50 | 9 | 59 |

* All three areas produced no ducks in 1958 and 1959.

Table 2. Summary Brood Survey in the Northeastern States 1959 (Based on 118 Comparable Areas)

| Species | Total Broods | | Young Produced | | Average Brood | | Percent of Change | | | |
|---------------------|--------------|------|-------------------|--------|------------------|------|-------------------|----------------------|--------------------|----------|
| | 1959 | 1958 | 1959 | 1958 | 1959 | 1958 | Young Increase | Produced Decrease | Broods Increase | Decrease |
| Black Duck | 305 | 257 | 1989.1 | 1668.0 | 6.5 | 6.5 | 19.3 | | 18.7 | |
| Wood Duck | 208 | 187 | 1428.9 | 1332.2 | 6.9 | 7.1 | 7.3 | | 11.2 | |
| Mallard | 69 | 49 | 497.2 | 337.0 | 7.2 | 6.9 | 47.5 | | 40.8 | |
| Ring-necked Duck | 15 | 27 | 123.8 | 204.4 | 8.3 | 7.6 | | 39.4 | | 44.4 |
| Blue-winged Teal | 49 | 22 | 436.3 | 217.4 | 8.9 | 9.9 | 100.7 | | 122.7 | |

PACIFIC FLYWAY

The trend in wintering population of ducks in the Pacific Flyway has been generally upward during the past 8 years, reaching a peak population in January 1959. In some respects this is in disagreement with information collected on the breeding grounds. For example, the total breeding population index for pintail reached a peak in 1956, and the 1959 breeding population is at least 40 percent below the 1956 level. In view of the fact that the Pacific Flyway winters from half to two-thirds of the total pintail population, there appears to be a discrepancy between the two sets of data.

There have been increases in population on some of the breeding areas supplying the flyway, and decreases in others. There were small increases this year in Alaska, southern Alberta, Montana, and Wyoming, and there was a major increase in northern Alberta and the Northwest Territories. There was a corresponding major decrease in breeding population in southern Saskatchewan and in the Dakotas, overall, the increases were somewhat greater than the decreases. As mentioned above, the total breeding population of pintail has decreased more than 40 percent from a peak population reached three years ago, and mallards have decreased more than 20 percent from a peak reached last year. Since approximately two-thirds of the total ducks killed in the Pacific Flyway is made up of these two species, they are of major importance in predicting fall flight in the Flyway.

For the most part, weather and habitat conditions in the breeding range supplying the Pacific Flyway were unfavorable. Severe drought sharply reduced production in the important breeding areas in southern Alberta and southern Saskatchewan. Many of the prairie nesters were obviously displaced northward into northern Alberta and the Northwest Territories by this drought, but in the north they ran into the latest spring that we have recorded since surveys were first initiated in this region in 1947. A species which ordinarily nests in pothole habitat in the prairies and parklands is not likely to reproduce at a normal rate in northern habitat even under the best of conditions, but when faced with a late spring, which drastically reduces the length of an already short breeding season, the chances of normal production from prairie nesters in northern habitat is very small. A report from a survey crew operating in the Northwest Territories indicated that broods were just beginning to appear on July 28. During three other years when July surveys were conducted in this area (1951, 1952, and 1954) the bulk of the broods from early nesting prairie species were

PACIFIC FLYWAY - Continued

on the water by this date and many of the broods were from 3 to 5 weeks old. It is concluded that the large increase in adult birds in northern Alberta and the Northwest Territories that were displaced from drought areas in the south will produce relatively few ducklings this year.

Only in Alaska, Montana, and Wyoming were breeding conditions and production judged to be better than last year. However, these increases will in no respect offset the reduction in production from the other important breeding areas.

As mentioned above, there were increases this year in the number of adult birds in the breeding range supplying the Pacific Flyway. However, an average fall flight is made up of more young than adults. In view of the sharp reduction in number of young produced this year it is estimated that there will be at least a moderate reduction in the fall flight of ducks this year in the Flyway. It is anticipated that the reduction will be greater for pintails than for mallards. Although canvasbacks and redheads are not important ducks in the Pacific Flyway, breeding conditions for these two species were particularly adverse this year and it is anticipated that there will be a drastic reduction in the populations of these two species.

On the basis of an increase in the wintering population of geese it is estimated that there may be a small increase in the populations of these species.

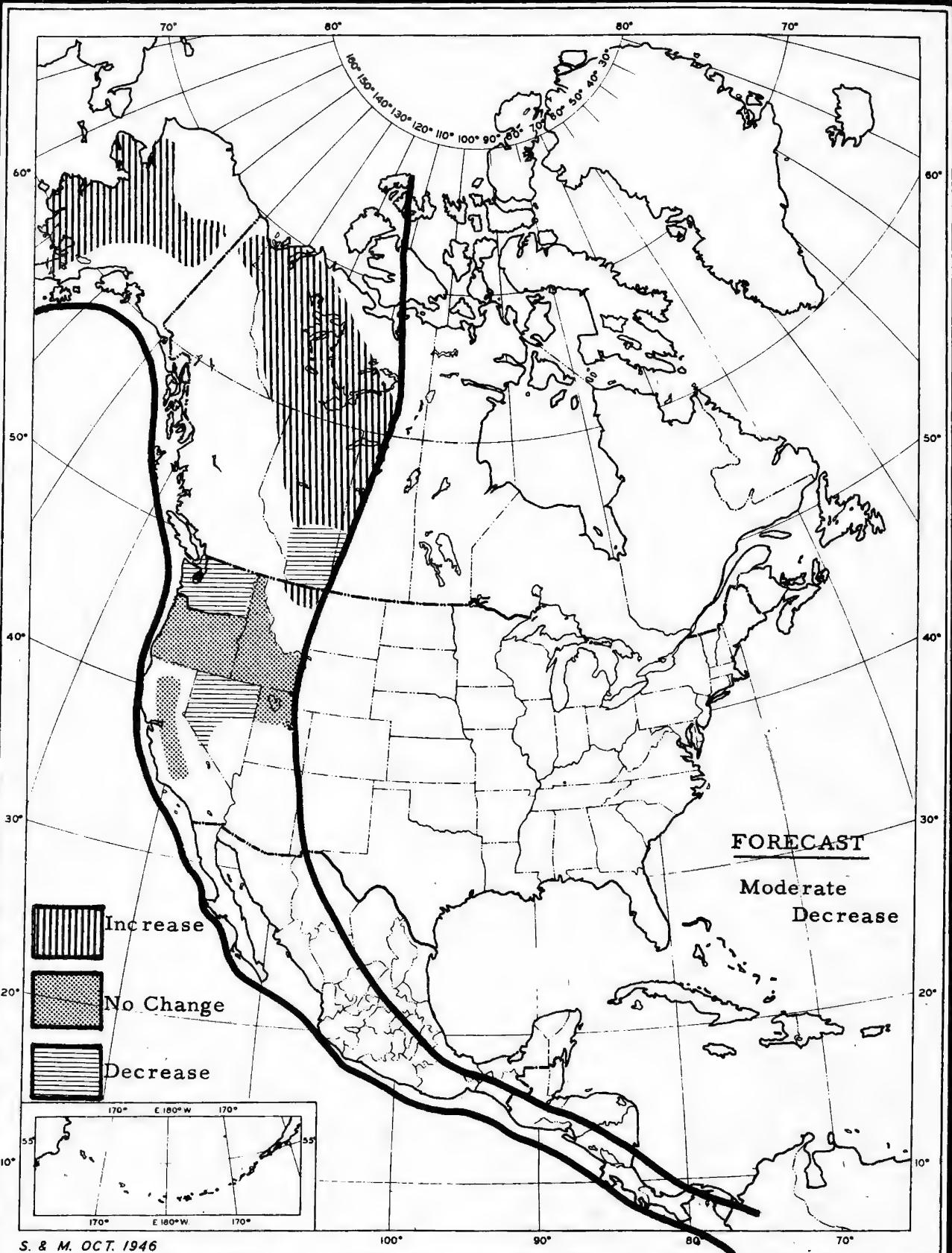
The breeding habitat for coot has been very adversely affected by the drought and it is anticipated that the fall population of this species will be sharply reduced as compared to last year.

The wintering population of brant was much reduced as compared to last year (- 68%). Although reports from the breeding areas in Alaska indicate favorable production this summer, the reduced size of the breeding population leads to the conclusion that the fall flight of brant may increase somewhat over last year, but will still be well below the average of the past several years.

1959 FALL FLIGHT FORECAST FOR DUCKS
PACIFIC FLYWAY

U. S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE



CENTRAL FLYWAY

The 1959 winter survey in the Central Flyway showed that there was some decrease among the dabbling duck species while the divers remained about the same. The winter index for the most important species in the Flyway, the mallard, decreased 42 percent. Decreases were recorded also for the snow goose and the white-front. The wintering population of Canada geese remained about the same.

The breeding range affecting the Central Flyway was beset by adverse weather and habitat conditions throughout most of the important areas. Severe drought markedly reduced the amount and quality of the habitat throughout the southern portion of the Prairie Provinces, the Dakotas, Minnesota, and Nebraska. Only in Montana were habitat conditions reasonably favorable. North of the prairies the birds were faced with the latest spring that we have recorded since surveys were started in 1947. Ice did not leave many northern lakes until late June, and freezing conditions were common throughout the month.

Within the general prairie and parkland pothole breeding range there was a decrease of more than 30 percent in the duck breeding population, with most of the decrease taking place in the Dakotas and in southern Saskatchewan. In spite of the drought in southern Alberta there was a small increase in the number of adult birds recorded during May as compared to a year ago.

Most of the birds which were displaced from the prairies and parklands by the drought conditions moved on northward into northern Alberta and the Northwest Territories where major increases in adult birds were recorded during the May-June survey.

During the May surveys within the drought areas there was a noticeable grouping of birds on the larger bodies of water that remained. Even during May there was doubt that these birds were actively engaged in nesting. Both ground and aerial surveys during July confirmed the fact that either many birds made no attempt to nest or else their first nests were unsuccessful and they gave up. All surveys throughout southern Alberta, southern Saskatchewan, and the two Dakotas recorded the lowest number of broods that have been tabulated since the breeding ground surveys were initiated. Also, there was little evidence that a late hatch could be expected. The situation in southern Manitoba was not quite as bad, since water conditions in southcentral Manitoba were much better than in the southwestern portion of the Province. Nevertheless, a considerable reduction in fall flight is expected from this area as compared to a year ago.

As mentioned above, the large number of prairie nesters that were displaced northward by the drought were faced with the latest spring that has been recorded since surveys were initiated in 1947. A species which ordinarily nests in pothole habitat in the parklands or prairies is not likely to reproduce at a normal rate in northern habitat even under the best of conditions, but when faced with a late spring, which markedly reduces the length of an already short breeding season, the chance of normal production is very small. A report from the aerial survey crew operating in the Northwest Territories indicated that the broods were just beginning to appear on July 28. During other years when July surveys have been conducted, the bulk of the broods of early nesting prairie species were on the water by this date, and many of them were from 3 to 5 weeks old. It is concluded that the large increase in adult birds in the northern portions of Alberta, Saskatchewan, and in the Northwest Territories will produce relatively few ducklings this year.

There will be increases in fall flight from Wyoming and Montana, but these increases will in no respect counterbalance the losses in the important areas further north.

Habitat conditions for species that nest over-water are particularly adverse this year and reproduction among canvasbacks, redheads, and coot appears to be almost a complete failure.

Overall, it is anticipated that there will be a marked reduction in the fall flight of ducks in the Central Flyway as compared to 1958. The fall flight of canvasbacks and redheads will be drastically reduced.

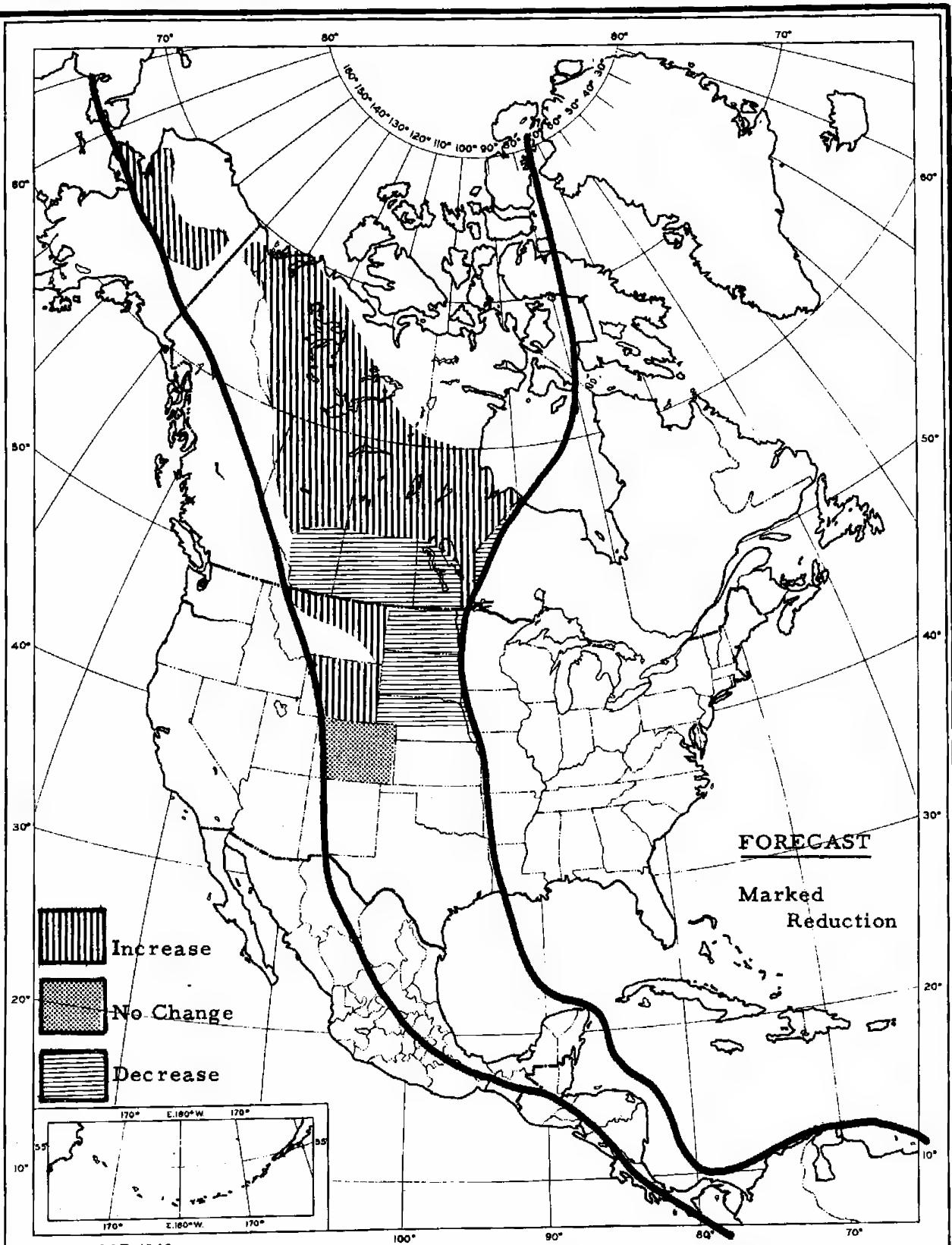
On the basis of a decrease in the breeding population of snow geese and whitefronts, as measured by the 1959 winter survey, it is estimated that there will be a small decrease in the fall flight of these two species. Since the wintering population of white-cheeked geese during January 1959 remained unchanged, it is estimated that the fall populations of this group of species will remain about the same.

Based on the reduced amount and poor quality of coot breeding habitat, and to the very small number of coot broods observed during the July surveys in important breeding areas, it is estimated that there will be a drastic reduction in the fall flight of this species.

1959 FALL FLIGHT FORECAST FOR DUCKS
CENTRAL FLYWAY

U. S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE



MISSISSIPPI FLYWAY

The annual winter survey conducted in January 1959 showed little or no change in the wintering population of ducks, geese, and coot in the Flyway, although there is some possibility that the flyway population of mallards decreased (see page 102).

When the birds returned north to the breeding areas this spring they encountered adverse breeding conditions in every respect. Drought had materially reduced the amount and quality of breeding habitat throughout the prairie and pothole production habitat in the southern portions of Alberta, Saskatchewan, and Manitoba, and in the Dakotas, Minnesota, and Nebraska. The drought reached greatest intensity in the Dakotas and southern Saskatchewan, forcing a large portion of the population to move elsewhere. The greatest portion of the movement was northward into northern Alberta and the Northwest Territories. In northern areas the birds encountered the latest spring which has been recorded since breeding ground surveys were initiated in 1947. The ice did not leave many northern lakes until late June, and freezing conditions were common throughout the month.

There was sufficient rainfall during June and July to insure moisture for agricultural crop production in many parts of the Canadian drought area, but since the ground was very dry there was practically no run-off to halt the drying trend in the potholes. The number of water areas recorded during July was much reduced over the number recorded in May in all but a few local areas.

During the May surveys within the drought area there was a noticeable grouping of birds on the larger bodies of water that remained. Due to this grouping it was doubted that they were making much of an effort to nest. Both ground and aerial surveys during July confirmed the fact that the amount of production was very low. All surveys throughout southern Alberta, southern Saskatchewan, and the two Dakotas recorded the lowest number of broods that have been tabulated since breeding ground surveys were initiated. Also, in these areas there was little evidence that a late hatch could be expected.

The situation in southern Manitoba is not quite as pessimistic, since water conditions in southcentral portion of the Province was not as bad as in the southwestern portion. Nevertheless, a considerable reduction in fall flight is expected from this area as compared to a year ago.

As mentioned above, the large number of prairie nesters that were displaced northward by the drought were faced with the

latest spring that has been recorded since breeding ground surveys were initiated. A species which ordinarily nests in pothole habitat in the parklands or prairies is not likely to reproduce at a normal rate in northern habitat even under the best of conditions, but when faced with a late spring, which markedly reduces the length of an already short nesting season, the chance of normal production is very small. A report from the aerial survey crew operating in the Northwest Territories indicated that broods were just beginning to appear on July 28. During other years when July surveys have been conducted in this area, the bulk of the broods of early nesters have been on the water by this date, and many of them have been from 3 to 5 weeks old. It is concluded that the large increase in adult birds in the northern Alberta and Northwest Territories will produce relatively few ducklings this year.

There will be increases in the fall flight from Missouri, Iowa, and Montana, but these increases will in no respect offset the losses in the important areas further north.

Habitat conditions for over-water nesters are particularly adverse this year and reproduction among canvasbacks, redheads, and coot appear to be almost a complete failure.

Overall, it is anticipated that the fall flight of ducks in the Mississippi Flyway will show a marked decrease as compared to last year. It is estimated that there will be a drastic decrease in the flight of canvasbacks and redheads.

By reason of a small reduction in the breeding population of blue geese, as measured by the annual winter survey, it is estimated that there will be a small decrease in the fall flight of this species.

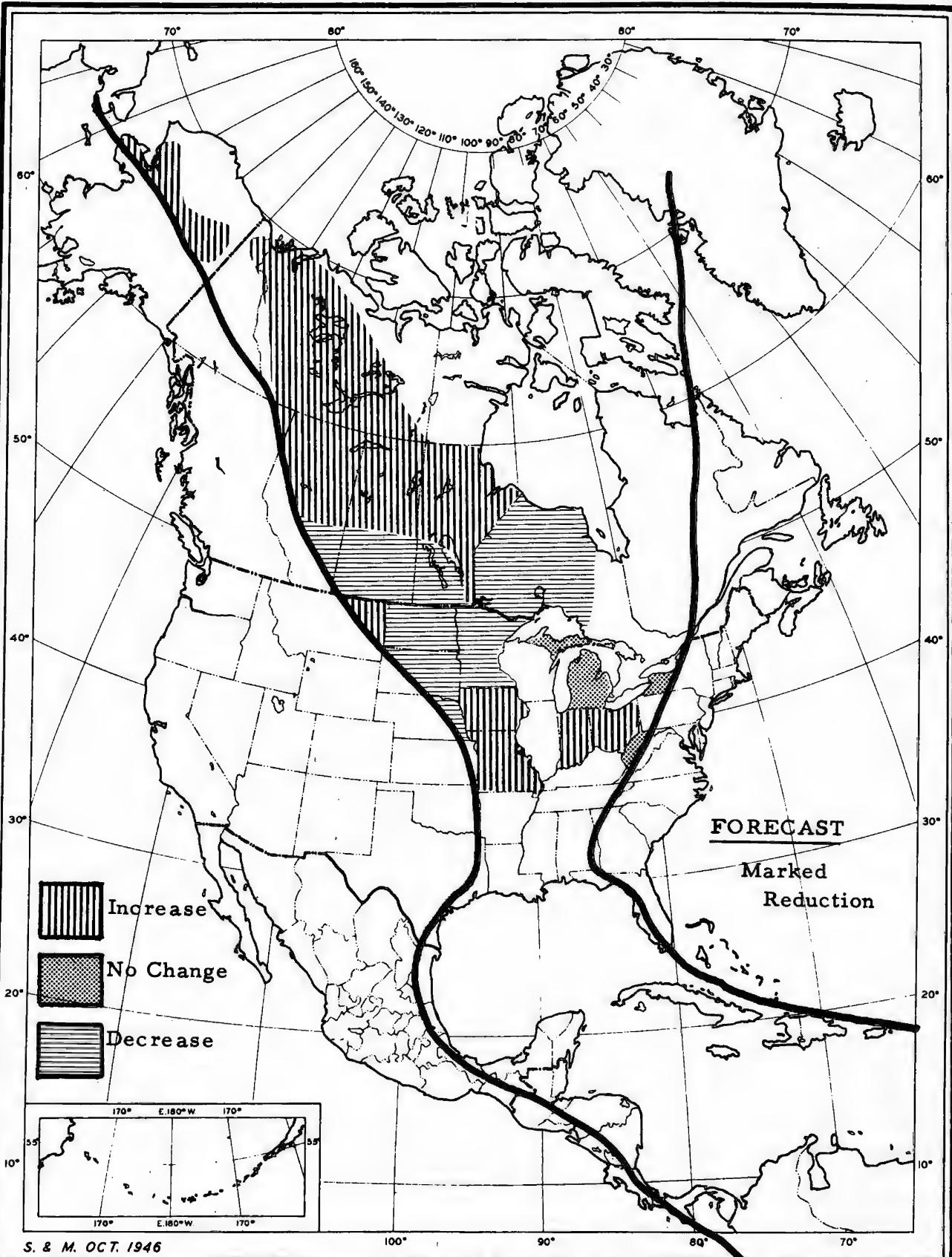
Since the breeding population of Canada geese remained essentially unchanged as compared to 1958, it is estimated that there will be no change in the fall flight of this species.

The breeding habitat of coot was materially reduced this year and the reduction in numbers of broods observed during the July surveys averaged about 80 percent. Therefore, it is estimated that there will be a drastic reduction in the fall flight of this species.

1959 FALL FLIGHT FORECAST FOR DUCKS
MISSISSIPPI FLYWAY

U. S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE



ATLANTIC FLYWAY

For the purpose of predicting changes in the size of the fall flight in the Atlantic Flyway it is not possible to rely on information from the breeding grounds to nearly the same degree that is possible in the three flyways to the west. Primarily, this is due to the fact that operational surveys have not yet been developed for the important Quebec - Labrador breeding area, and adequate methods of appraising changes in production of young have not been developed for forest and tundra breeding areas in the remainder of the northern part of the continent. Therefore, it is necessary to depend largely on the results of the annual winter survey for the purpose of determining population trends in the Flyway.

Attention is called to the discussion of the winter survey results on pages 144 through 146 and to the graphs on pages 147 and 148. It seems evident that there was no recovery during 1958 from the low population level that was recorded during the winter survey at the beginning of the year. Rather, there is some possibility that there may have been a small decrease in the total duck population, which means that at the start of the 1959 breeding season the population was more than 50 percent below the peak level reached in 1953, and for both 1958 and 1959 was well below any other year during the past 11.

From what is known of breeding conditions affecting the Atlantic Flyway breeding population there is little reason for optimism. Severe drought and very low production characterized the southern portions of the Prairie Provinces, the Dakotas, and Minnesota, which supply the bulk of such species as the mallard, blue-winged teal, canvasback, redhead, baldpate, and pintail to the Flyway. Since these species made up 40 percent of the total duck kill in the Flyway during the 1958-59 season, the implications cannot be ignored. Breeding habitat conditions were particularly adverse for over-water nesters, such as the redhead, canvasback, and coot.

In the northern portions of the Prairie Provinces and the Northwest Territories the spring was the latest recorded since surveys were first initiated in 1947. Many lakes were covered with ice until late June and freezing temperatures were common during the month. A report from an aerial survey crew operating in the Northwest Territories stated that broods were just beginning to make their appearance on July 28. During other years when July surveys have been run in this area the bulk of the early nesters were already on the water by this date

ATLANTIC FLYWAY - Continued

and many of them were from 3 to 5 weeks old. It is believed that this indicates that the rate of production will be low in this important northern breeding area.

Overall, it is anticipated that there will be at least a moderate decrease in the fall flight of ducks from the low population level of last year. It is estimated that there will be a drastic reduction in the flight of canvasbacks and redheads.

The 1959 breeding population of Canada geese, as measured by the annual winter survey, remained about the same as last year. Therefore, it is estimated that the fall flight will remain about the same. However, attention is called to the fact that there has been a gradual decrease in the population of Canadas during the past 4 years and the 1959 wintering population was 41 percent below the peak level reached in 1955.

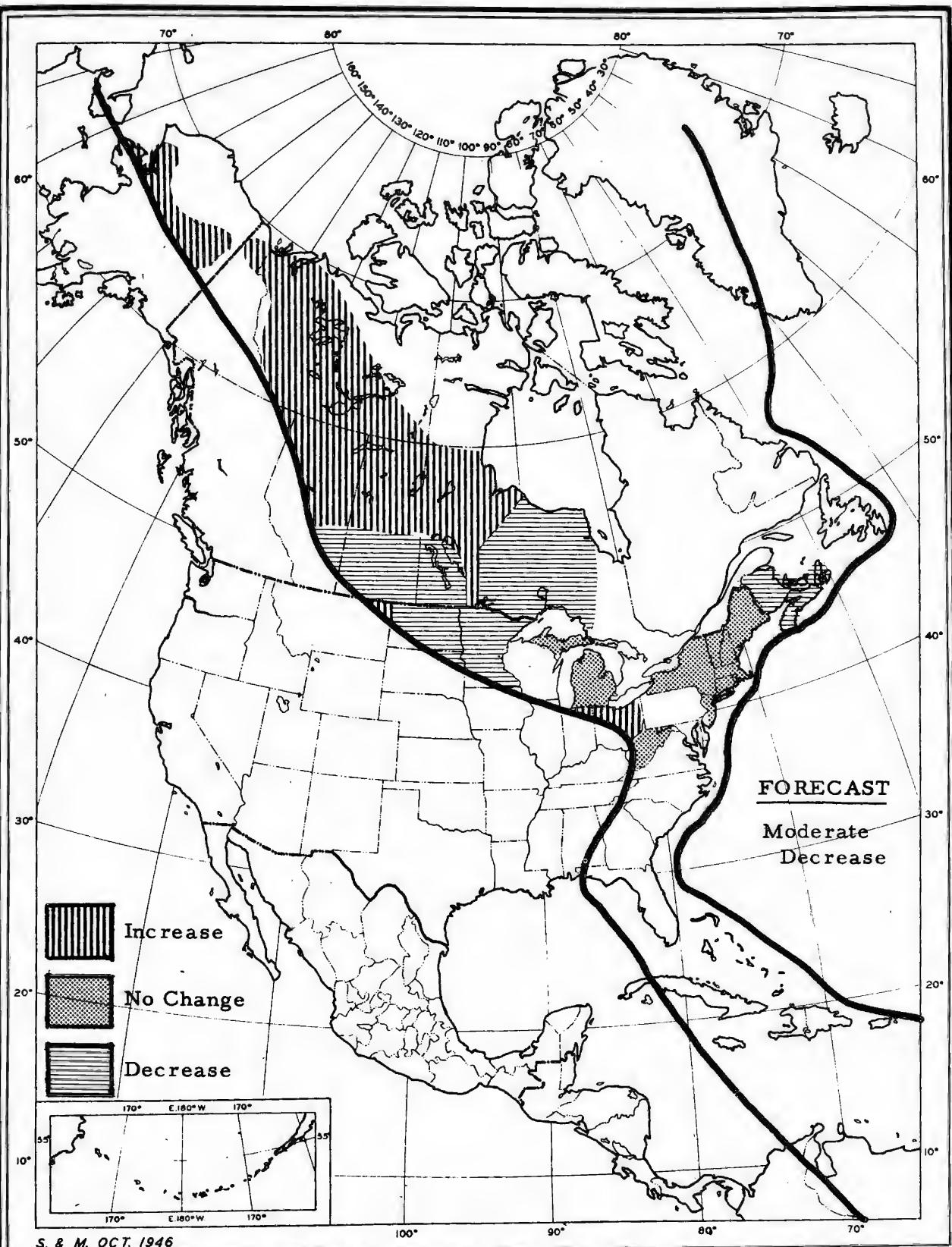
A small increase was recorded in the wintering population of American brant. The population trend of this species has been generally upward during the past 11 years. On this basis, it is estimated that there will be a small increase in the fall flight of brant this fall.

Due to a drastic decrease in the amount of breeding habitat and in the production of coot, it is estimated that there will be a drastic reduction in the fall flight of this species.

1959 FALL FLIGHT FORECAST FOR DUCKS
ATLANTIC FLYWAY

U.S. DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE



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UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Bureau of Sport Fisheries and Wildlife
Washington 25, D. C.

**Hunter Kill of Migratory Waterfowl in the
Pacific Flyway During the
1958-59 Hunting Season**

Earl L. Atwood, Chief
Section of Wildlife Biometry
Patuxent Wildlife Research Center
Laurel, Md.

Supplement to
Special Scientific Report -- Wildlife No. 45

January 1960

BHL



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FOREWORD

Each year a Status Report of Waterfowl is prepared which summarizes the results of three surveys and presents a forecast of anticipated change in the relative size of the fall flight of ducks, geese, brant and coot in each of the waterfowl flyways in the United States.

One of the surveys summarized in the above report is a survey of waterfowl hunters carried out immediately following the waterfowl season to measure the size of the kill and the effect of hunting regulations on hunter activity and kill.

A fire in the I.B.M. processing room in late June 1959 destroyed all of the original waterfowl hunters survey records from the states of Arizona and Nevada and part of the records for California, Idaho, Oregon and Utah before tabulations had been prepared from them for the Hunter Kill of Migratory Waterfowl in the Pacific Flyway During the 1958-59 Waterfowl Hunting Season. The process of salvaging records and completing the report for this Flyway was not accomplished by printing deadline for Special Scientific Report -- Wildlife No. 45. The purpose of this report is to complete the 1959 Status Report of Waterfowl.

SCOPE OF INVESTIGATIONS AND METHODS USED

Waterfowl Kill Survey

Each year following the shooting season the Bureau carries out a mail-questionnaire survey among waterfowl hunters for the purpose of determining the number of birds killed and the relationship between hunting regulations, hunter activity, and harvest. Mailing addresses for the questionnaire survey are obtained at the time the duck stamps are purchased at a series of randomly selected post offices. During the past year the plan for selecting Post Office Sampling Units was modified somewhat by including post office substations as well as the main post offices in the list from which the units were drawn. This modification reduced the average size of the sampling units and increased their uniformity. This change became possible as a result of certain modifications in accounting practices in the Post Office Department and has resulted in an increase in sampling efficiency.

The specific objectives of the 1958-59 kill survey were as follows:

1. To estimate total retrieved¹ and unretrieved ducks, geese and coots, by Flyways.
2. To estimate total number of potential and active waterfowl hunters, by Flyways.
3. To estimate the average times hunted per waterfowl hunter.
4. To estimate the geographic and density distribution of hunters in the areas of waterfowl hunting.
5. To estimate number of banded waterfowl bagged.
6. To determine proportion of waterfowl hunting on lands under private and public jurisdiction.
7. To estimate the distribution of hunters on seven broad habitat types.

Only the results related to Objectives 1 through 3 above are being reported at this time. Data related to Objectives 4 through 7 will be summarized and analyzed in a later publication.

¹The primary sampling objective being a standard error not in excess of 5 percent of the mean bag of ducks.

The number of questionnaires mailed out and the number returned in the Pacific Flyway are shown in the following table:

| No. of Hunters Receiving Questionnaires | | No. of Hunters Responding | | Percent Responding | |
|---|---------|------------------------------|---------|-----------------------|---------|
| 1958-59 | 1957-58 | 1958-59 | 1957-58 | 1958-59 | 1957-58 |
| 11,756 | 6,634 | 8,396 | 4,743 | 71.4 | 71.5 |

Fortunately, the fire loss of survey records from Arizona and Nevada is not important with respect to the effect upon the estimate for the flyway, since the proportion of hunters in these states was only 5.3 percent of the hunters in the flyway during the 1958-59 season. The minor fire loss of records in California, Idaho, Oregon and Utah did not introduce bias errors in the samples and it is believed that the data used in preparing this report is representative of about 94.7 percent of the hunters in the flyway.

Experience has shown that mail-questionnaire data from hunters contain both sampling errors and response-bias errors. Hunters tend to exaggerate when reporting their kill which results in an inflated estimate. These response errors are not consistent in size from one area to another or from one year to the next in the same area. Also, they are large as compared to sampling error and their presence seriously limits the usefulness of the survey data unless they are removed.¹

Methods for removing response-bias errors have been developed² and kill data presented in this report have been adjusted in accordance therewith.

¹E. L. Atwood, Validity of Mail Survey Data on Bagged Waterfowl, Journal of Wildlife Management, Vol. XX, No. 1, pages 1 through 16.

²E. L. Atwood, A Procedure for Removing the effect of Response Bias Errors from Waterfowl Questionnaire Responses, Biometrics, Vol. XIV, No. 1, March 1, 1958.

Pacific Flyway Data

Waterfowl Kill Information

The following table presents the estimated number of waterfowl bagged and waterfowl knocked down but not retrieved during the 1957-58 and 1958-59 shooting seasons as determined by the Waterfowl Hunter Mail Survey:

| Species | 1958-1959 | 1957-1958 | Percent Change 1957-58 to 1958-59 |
|---------------------------|-----------|-----------|---|
| Mallard | 1,227,009 | 1,118,708 | + 9.68 |
| Pintail | 851,253 | 794,134 | + 7.19 |
| American Wigeon | 443,292 | 332,918 | +33.15 |
| G-W Teal | 367,731 | 308,336 | +19.26 |
| Shoveler | 156,854 | 140,575 | +11.58 |
| Canvasback | 67,988 | 69,786 | - 2.58 |
| B-W Teal | 85,879* | 67,841* | +26.59 |
| Ruddy | 44,051 | 49,997 | -11.89 |
| Scaup | 36,130 | 40,316 | -10.38 |
| Redhead | 30,676 | 30,641 | N.C. |
| Bufflehead | 20,323 | 18,264 | +11.27 |
| Gadwall | 37,902 | 29,547 | +28.28 |
| Goldeneye | 26,750 | 21,204 | +26.16 |
| Cinnamon Teal | 29,043* | 41,264* | -29.62 |
| Merganser | 12,472 | 12,390 | N.C. |
| Scoter | 8,477 | 5,613 | +51.02 |
| Wood Duck | 22,408 | 9,135 | +145.30 |
| Ringneck | 5,836 | 4,630 | +26.05 |
| Others | -- | 670 | -- |
| Total Ducks Retrieved | 3,474,075 | 3,095,968 | +12.21 |
| Total Ducks Not Retrieved | 615,493 | 591,372 | + 4.08 |
| Total Duck Kill | 4,089,568 | 3,687,340 | +10.91 |
| Canada Goose | 82,959 | 100,507 | -17.46 |
| Snow Goose | 63,306 | 82,422 | -23.19 |
| Cackling Goose | 59,034 | 69,421 | -14.96 |
| White-fronted Goose | 69,667 | 59,782 | +16.54 |
| Brant Goose | 8,909 | 11,948 | -25.44 |
| Others | -- | 593 | -- |
| Total Geese Retrieved | 284,175 | 324,673 | -12.47 |
| Total Geese Not Retrieved | 42,400 | 52,961 | -19.94 |
| Total Goose Kill | 326,575 | 377,634 | -13.52 |
| Total Coots Retrieved | 149,810 | 171,781 | -12.79 |
| Total Coots Not Retrieved | 54,270 | 51,780 | + 4.81 |
| Total Coot Kill | 204,080 | 223,561 | - 8.71 |

*It is probable that both Blue-winged and Cinnamon Teal are included in the estimates for each of these species since the coloration of the female in these species is identical. The net error resulting from this misclassification is unknown.

Pacific Flyway Data

Number of Hunters, Average Times Hunted, Seasonal Bag, Seasonal Unretrieved Kill and Daily Bag as Determined by the Waterfowl Hunter Mail Survey.

| | | | Percent Change 1957-58 to 1958-59 |
|---|----------------|----------------|---|
| | 1958-1959 | 1957-1958 | |
| Number of Potential Hunters | | | |
| Over 15* | 386,047 | 409,719 | - 5.78 |
| Under 16 | 36,660 | 28,638 | +28.01 |
| | <u>422,707</u> | <u>438,357</u> | - 3.57 |
| Number of Active Hunters** | | | |
| Over 15 | 325,619 | 347,722 | - 6.36 |
| Under 16 | 27,577 | 22,527 | +22.42 |
| | <u>353,196</u> | <u>370,249</u> | - 4.61 |
| Average Times Hunted** | 4.095 | 4.303 | - 4.83 |
| Average Seasonal Bag** | | | |
| Over 15 | Ducks | 10.252 | 8.691 |
| | Geese | .848 | .908 |
| | Coots | .510 | .451 |
| Under 16 | Ducks | 4.922 | 3.276 |
| | Geese | .287 | .393 |
| | Coots | .859 | .666 |
| Average Seasonal No. not retrieved** | | | |
| Over 15 | Ducks | 1.788 | 1.654 |
| | Geese | .126 | .148 |
| | Coots | .139 | .120 |
| Under 16 | Ducks | 1.205 | .694 |
| | Geese | .053 | .059 |
| | Coots | .330 | .445 |
| Average Daily Bag** | | | |
| Over 15 | Ducks | 2.504 | 2.020 |
| | Geese | .207 | .211 |
| | Coots | .125 | .105 |
| Under 16 | Ducks | 1.202 | .761 |
| | Geese | .070 | .091 |
| | Coots | .210 | .156 |

*Individuals who purchased a Duck Stamp with intent to hunt.

**Individuals who hunted at least once.

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